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Original Articles

Some of the Causes of Still-birth and Methods of Prevention

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Among the common causes of still-birth may be mentioned: (1) toxemia of pregnancy; (2) syphilis; (3) accidents at time of delivery; (4) placental displacement; (5) abnormal position of the fetus *in utero;* (6) pre- and post-maturity; and (7) contracted pelvis.

The prenatal clinics established throughout the country during the last few years, and especially those operating in the larger cities, have undoubtedly been instrumental in reducing the percentage of still-births through the instruction of pregnant women in hygienic modes of life, proper clothing, food, exercise, etc.; yet the greatest amount of publicity among people in general appears to have been given to the care and protection of the living rather than the unborn infants. Therefore, it seems to me that the question of preventing still-births should be further considered by the medical schools in the teaching of students, by the various medical societies, in greater detail by the prenatal clinics, and last but by no means least by the physician in charge of the individual case, if any considerable improvement is to be made in existing conditions.

To-day, in private practice, we are usually consulted early by the pregnant woman, we are expected to supervise her mode of life, and keep her, as well as her unborn infant, healthy until the time of delivery. While she may not state in direct words what she expects, yet by placing herself early under our care there is the implied expectation that she will be given proper attention during the remaining period of utero-gestation and will be delivered at term of a living and healthy child. The physician who is thus called should assume the responsibility and do whatever may be necessary to guard and protect the patient and her unborn child by the exercise of all the skill of which he is possessed.

During the early months of pregnancy every woman, whether healthy or otherwise, should be given a complete physical examination. Especial attention must be devoted to the condition of the heart, lungs, liver, and kidneys. It is important for the physician to know that the functions of these four vital organs are being properly performed, since functional disturbance of any one of them may cause serious manifestations later in pregnancy. The teeth, tonsils, etc., should be examined for possible foci of infection. Blood-pressure readings are important early in pregnancy and should be made thereafter as frequently as the physician may think necessary until the time of delivery. Chemical and, if thought advisable, also microscopic examination of the urine should be frequently made. Test of renal function will sometimes show that the woman has chronic nephritis, which remaining untreated may produce toxemia of pregnancy even to the point of convulsions. It is advisable early in the course of preg-

nancy to make careful pelvic measurements, not only at the inlet, but also at the outlet, however inaccurate or unimportant these measurements may seem.

Later in pregnancy, certainly during the eighth month, one should if possible determine the position of the fetus *in utero*. If positive evidence is secured that a persistent occipito-posterior position exists, then the question arises whether an attempt by external manipulations should be made to turn the child into the anterior position. This procedure in my opinion is fraught with considerable danger, on account of the possible damage to the placenta or stretching of the cord, either of which may cause death of the infant. It may be safer to allow the posterior position to remain until the time of delivery, and then determine the best procedure; whether it be podalic version, Cæsarean section, or forceps delivery. In many instances spontaneous rotation occurs and posterior presentations become anterior before delivery. Moreover, certain movements on the part of the mother, the assumption of different positions, etc., often facilitate rotation.

Determination of the placental position and attachment is also important as early as possible during pregnancy. When the pregnant woman has a bloody discharge after the third month, this should at least create the suspicion of placenta prævia or slight detachment of a normally implanted placenta. Under such circumstances absolute rest in bed is to be enjoined with sedatives or even opiates when required to keep the patient quiet until the exact condition can be determined.

The early evidences of prematurity are "distress symptoms" on the part of the child, such as a slow or markedly irregular and feeble heart action, unusually vigorous movements, and sometimes the escape of meconium into the vagina of the mother. In the presence of such symptoms the physician should immediately intervene. The safer plan is to deliver the child at once if pregnancy has advanced to the eighth month. In post-maturity the age of the fetus may be determined with a fair degree of accuracy by consideration of the last menstrual period, by quickening, and by measurement of the child *in utero*. I do not mean to infer that the exact dimensions of the child in relation to the pelvic diameters can be determined with sufficient accuracy to justify the immediate induction of labor by dilating the cervix with fingers or bag, but I think we can administer castor oil and quinine with perfect safety. In fact, it is my opinion that more harm has been done by artificially inducing labor in such cases than by waiting until the time when labor begins, and then allowing the woman to attempt natural delivery before resorting to vaginal examination or any other form of manipulation. If there is no progress, and it is certain from pelvic measurements and from the size of the child that normal delivery is impossible, then one should choose the most suitable method of procedure and persist in it; whether it be forceps or Cæsarean section.

The statistics in regard to still-births are always interesting. In the New York Lying-in Hospital for 1924 there were forty-one still-births in each thousand deliveries, and in addition to these twenty-eight infants lived only for a month or two after delivery, thus making a total of sixty-nine per thousand. Kickham, of St. Elizabeth Hospital, reports fifty-five still-births in each thousand deliveries. Statistics for the city of Detroit in 1922 showed still-births of fifty-three per thousand. The report on prenatal care for the same city showed an infant mortality of thirty-one per thousand.

The foregoing figures are startling, and while of course no one can hope to prevent infant mortality from congenital abnormalities, miscarriages, abortions, and certain other causes, the fact remains that by proper care and being more alert in watching women with full-term pregnancies we can in many instances prevent the birth of still-born infants.

Toxemia of Pregnancy.—In referring to the toxemia of pregnancy, I wish to report the last case coming under my observation, not because of its serious nature—as I have time and again seen the condition progress to the stage of convulsions—but because it seems of more than ordinary interest. The

tremendous fetal and maternal mortality from the toxemia of pregnancy is well understood.

The patient was twenty-two years old, married three years, a primipara. I first saw her during the third month of uterogestation. She had then for four weeks been under the care of another physician, who had never examined her, but told her she was pregnant, and had analyzed one specimen of her urine. She was restless, greatly emaciated, weighing about eighty pounds, had been vomiting incessantly for nearly five weeks, and was unable to retain any food or even water. There was some edema of both ankles.

I immediately sent the patient to the hospital for observation and more detailed examination. Her blood-pressure was then 164/70; pulse 120; no evident cardiac lesion. The liver was normal in size; lungs, teeth and tonsils negative. Chemical examination of the urine revealed an abundance of albumin and very high acidity; microscopic examination showed many pus cells, casts, indican ++. Her lips, tongue and throat were reddened and presented a parched appearance. She was placed in bed, sedatives (bromides and chloral) administered, all food withheld, alkalies given to overcome the acidity, colonic irrigation with sodium bicarbonate solution one gallon twice daily at first, followed by glucose per rectum.

Within three days vomiting had practically ceased, her renal function had improved, and she rested better. After a week in the hospital her blood-pressure was 140/70. Liquid diet had then been allowed for two days, and the amount of food was thereafter gradually increased. She was slightly nauseated once or twice during the second week, at the end of which time her blood-pressure was 120/70, she was happy, her nervous symptoms had subsided, her urine was practically negative (still a trace of albumin), and at her request she was allowed to go home.

This woman is now seven and a half months advanced in pregnancy, her blood-pressure is 120/70, the urine is negative, and she weighs one hundred and twenty pounds. I expect to deliver her of a living child in about six weeks.

Syphilis.—The percentage of still-births due to syphilis of the mother is well known. In my private practice I do not have routine blood Wassermann tests made on pregnant women, neither do I advocate it, since the results have been almost universally negative. The case I wish to report is as follows:

An unmarried girl of eighteen, a stenographer, previously healthy, contracted syphilis. When she consulted me her blood Wassermann showed four-plus positive. She was given intensive treatment with arsphenamine and mercury for six or eight months. As too often happens she then considered herself well and declined further treatment.

I heard nothing further from this patient for twelve months. She then returned, and it was easily determined that she was about eight months advanced in uterogestation. She had continued to work during her pregnancy until she came to ask my advice. I recommended that she go to the city hospital and be delivered, which she did. Three months later she told me that her baby was small and delicate at birth (syphilitic) and lived only a few weeks.

About a year and a half later this woman returned stating that she married four months previously and had then missed three menstrual epochs. Examination disclosed that she was about three months pregnant. Her blood Wassermann was then two-plus positive. I reinstituted specific treatment, this time using neoarsphenamine (instead of arsphenamine), mercury, and potassium iodide. There were no complications; she was now a very obedient patient, and at the eighth month of pregnancy had a negative Wassermann reaction. I delivered her at term of a healthy female child. Specific treatment was given irregularly for several months after the birth of her baby.

This woman became pregnant again just twelve months after the previous delivery. When three months advanced in this gestation her blood Wassermann was still nega-

tive. However, she took some treatment at intervals throughout the course of the pregnancy, and was delivered at term of a healthy male baby. The mother and the two children are living and well to-day.

Accidents.—Only one of the numerous accidents of pregnancy will be considered. The case to be reported is one of prolapsed cord in twins. The fetal mortality from this accident is very high.

The patient was a primipara, aged twenty-four, physically well, with more than the average intelligence. Her husband was a bright and healthy young business man. Her pelvic measurements were ample, blood-pressure normal, and urinalysis negative throughout the entire gestation.

When seven and a half months advanced in pregnancy abdominal distention became sufficient to cause some discomfort. After a careful external examination I was positive that twin pregnancy existed, but did not so inform the patient. During the eighth month she became still more uncomfortable from the distention. I visited her one day and found her in bed, not suffering in any way, but with both legs in constant motion, in fact "kicking." I then informed her (she believed it even before) that she was going to have twins. Investigation showed one baby in the L. O. A. position with back to the right (of mother), the other in the cephalic position with back to the left (of mother).

The patient was kept in bed at home for two weeks. She telephoned late one afternoon stating that she "was having pains and was going to the hospital." By external examination at the hospital it was determined that both babies were alive and apparently all right. She had no further pains and the following morning went home. Two days later she telephoned that she was returning to the hospital, where I saw her three hours after admission. She had then been in labor for practically four hours. I made another external examination and found the heart action of both babies normal. Within a short time pains appeared closer together and more severe, and labor began in earnest. I then asked for sterile gown and gloves and the first vaginal examination was made. The cervix was found partially dilated and the membranes protruding. Just then a severe pain occurred, the membranes ruptured, and there appeared into the vagina a prolapsed cord. The cord pulsated normally for a few minutes; then the descending head impinged upon the cervix and the cord ceased to pulsate. I attempted for the moment to replace the cord and was unsuccessful, but as soon as the pain ceased, thus relieving the pressure, I could again feel the cord pulsating regularly. I then ordered the patient to the delivery room and enlisted the assistance of everybody within reach—three nurses and one interne. Forceps were applied, and within ten minutes a fine boy baby was delivered without laceration of the mother. Five minutes later the child was crying lustily. The second infant, a female, was delivered about forty minutes later.

Both babies lived, the mother made an uninterrupted recovery, and all three left the hospital in eighteen days. The babies nursed at the breast, with supplemental feeding, for three months, and were thereafter completely nourished on the bottle. They are now seven months old; the boy weighs twenty-one and the girl twenty and a half pounds.

Placental Displacement.—The fetal as well as the maternal mortality is high in placental displacements, especially in placenta prævia. The case I wish to report is one of placenta prævia lateralis.

The patient was twenty-five years of age, a primipara, physically well, a very obedient and sensible woman. Her blood-pressure was normal and urinalysis at all times negative. Pelvic measurements normal.

Nothing out of the ordinary happened in this case until the seventh month of utero-gestation, when the patient telephoned for me as a slight hemorrhage had occurred. She was instructed to go to bed, and I called to see her shortly thereafter. Vaginal examination showed that she had lost not exceeding one or two ounces of clear blood. There was only slight dilatation of the cervix, but I could feel a "boggy" thickening

on the left side. I administered a hypodermic injection of morphine and left instructions to call me if necessary.

When I saw her the following day there was still some hemorrhage. She was then sent to the hospital for absolute rest in bed and further observation. I watched her carefully during the next week, and by that time bleeding had ceased. She was kept in bed in the hospital three weeks longer; no further hemorrhage occurred, and then at her urgent request, knowing that she was a very obedient patient, she was allowed to go home, with instructions to remain in bed as she had in the hospital until time for delivery.

Within four weeks I was notified that she was having some pain, and there was again slight hemorrhage. I saw her immediately. The cervix was then softened, easily admitting two fingers, and just within the cervix I could feel the placenta. She was at once sent to the hospital and labor progressed rapidly. Slight bleeding accompanied each pain. I administered ten grains of quinine, and as soon as preparations could be completed she was sent to the delivery room. The cervix was dilated by means of the fingers, the membranes ruptured, and the head promptly descended, which prevented further hemorrhage. In the meantime she had not lost a great amount of blood.

Labor progressed normally and she was delivered of a seven-pound boy. The placenta, implanted on the left side of the cervix, was detached and removed. The patient with her baby left the hospital in two weeks. She nursed the child until the normal time for weaning.

FRANCIS BUILDING.

Ultraviolet Light as a Therapeutic Agent[1]

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Like many newly discovered remedies brought before the profession in the past, ultraviolet medication has passed through an episode of hysterical skepticism. While it is true that contrivances or drugs designed for healing the sick must merit recognition prior to universal indorsement, nevertheless one must not be misled into erroneous belief by improperly constructed facts gathered at random. On the other hand, overzealous enthusiasm in adopting a comparatively recent agent which has not proven itself worthy of support by the test of time is equally productive of harm. There are those among the profession who entertain a profound distrust for artificial heliotherapy. Such individuals have failed to avail themselves of the opportunity in treating entities not usually benefited by routine drug therapy. Others unjustly biased lack proper experience with the rays, which can be obtained only by treating a large variety of conditions in many patients.

It is folly to assume that quartz light therapy parallels the effect of the sun. Artificial light produced by the quartz lamp is, however, the nearest rival to sunlight. There is sufficient evidence based upon facts and not varied fancies which when carefully weighed proves the value of this comparatively new treatment in many diseases. We feel that artificial sunlight, or better called actinotherapy, deserves a proper place among recognized standard methods of restoring health. Its use in applied therapeutics is just as important as is routine medication to the internist, radium and *x*-ray to the roentgenologist, and in one or two instances is comparable to the effects produced by arsenicals and mercury in lues. These rays are particularly useful to the general practitioner when other measures for reëstablishing health have proven unsatisfactory. Before entering into a con-

[1]Read before Section on Medicine, College of Physicians. From the Quartz Light Clinic at the Jefferson Hospital.

sideration of our personal experience with ultraviolet medication, it would be appropriate to briefly review a few of the properties of light therapy which have attracted wide-spread discussion in the last several years.

Solar and Therapeutic Spectra.—Radiation consists of a series of wave lengths or vibratory movements which pervades all space contained in a hypothetical ether. These vibrations differ in their effects as well as in length measurements. Those waves readily seen by the naked eye are regarded as belonging to the class of the visible spectrum. Most of the rays of the solar spectrum are visible. The component colors include violet, indigo, blue, green, yellow, orange, and red. Each of these seven elements are of different wave lengths. Collectively they constitute sunlight. Beyond the red and violet rays are longer and shorter waves, not demonstrable to vision, but nevertheless present. These rays are detected by special senses such as hearing, the pain sense, etc. The infra-red ray, for example, is capable of inflicting a burn when applied locally, the severity depending upon physical factors which need not concern us at this time. The point to be remembered about infra-red is that they are the heat rays. The warmth and comfort produced from a red-hot furnace, or the pain from close contact with a lighted cigar, are familiar examples of infra-red effect. Of far greater interest and importance are those much longer waves, in fact the longest known, but of very short frequency. Because they were first discovered by Dr. Hertz, during the latter part of the eighteenth century, they are known as Hertzian waves. The wireless telegraph, the telephone and popular radio owe their existence to these invisible radiations.

Digressing toward the other end of the spectrum shorter wave lengths of therapeutic importance are to be found. Ultraviolet, *x*-rays and the gamma rays of radium compose the diametrically shorter zone. The ultraviolet consists of shorter rays than those of the violet band. The gamma rays of radium are the shortest rays, while *x*-rays occupy a position somewhere between the two. All of the three last mentioned rays are invisible light endowed with powerful properties, which adapts them for certain well defined pathologic states. Ultraviolet medication is sometimes alluded to as actinotherapy and chemotherapy, so named because of the action of the actinic or chemic rays. When produced by commercial contrivances, as for example a quartz lamp, the term mercury vapor, quartz light or artificial heliotherapy is employed. The wonders of *x*-rays and remarkable emanations from radium need no comment. There are additional rays which have attracted attention in the past few months. Since they bear no direct relation to the subject of this paper, they are of momentary interest.

Ultraviolet Light.—Ultraviolet light is composed of invisible waves of the solar spectrum or is produced by artificial means. These rays are endowed with distinct chemic properties. In position as to wave length they occur in that region between the visible violet light and invisible but powerful *x*-rays. As manufactured upon a commercial scale ultraviolet results from the passage of a direct electric current through a fusible metal heated to incandescence. The chief sources in the selection of metallic substances for ultraviolet light production is derived from the ores of four minerals, namely, platinum, tungsten, iron, and mercury. Mercury is the element of choice because it is abundant and comparatively within purchase price. Furthermore, quicksilver yields the greatest percentage (20 to 29%) actinic rays when treated in the manner described. Quartz glass serves the purpose as a receptacle for the mercury, which is contained in a vacuum. Technically speaking, the arrangement of the quartz tube containing mercury *in vacuo* is called a uviarc. Ordinary glass is objectionable for this purpose because of the readiness with which glass filters out the therapeutic rays. A voltage of 70 generates the proper degree of current necessary to volatilize the metal.

Varieties of Ultraviolet.—Just as the infra-red waves are subdivided into long and short rays, so, too, ultraviolet light is known

to consist of three rays of different wave lengths. They are termed near, middle and far ultraviolets. It appears as though most of the beneficent effects produced in treatment owe their action to the near rays. At higher altitudes such as mountainous districts, natural sunlight is certainly richer in the near elements. By the time the sun's rays reach sea level, there is practically no near ultraviolet because atmospheric phenomena (chemicals, gases, dust, smoke, etc.) sift out and absorb most of these bands. The importance of these facts from a practical standpoint of ray length lies in the difference between the air- and water-cooled lamps which are found upon the market. The air-cooled lamp is equally abundant in both long and short rays. There are few long rays in the water-cooled lamp, the short ultraviolet predominating.

Natural Sunlight versus Artificial Heliotherapy.—There are distinct advantages as well as disadvantages in the utilization of ultraviolet light from natural and artificial sources. No one doubts the superiority of the sun to the light produced by artificial means. The brilliant results achieved by Rollier of Switzerland, Lo Grasso of Perrysburg, N. Y., and others by exposing patients to natural sunlight are adequate proof of the preference for natural sunshine. Science has as yet been unable to determine the precise value of each individual ray of the solar spectrum. It is only fair to assume that the well-known effects produced on the sands at the shore are dependent upon a combination of many rays but contributed largely by the ultraviolet. Interesting is the fact of the efforts in this connection which are being made among proprietary concerns to perfect a lamp unique and a qualitative representative of all spectra colors. When completed this synthetic mechanism will be a closer imitation of the natural sun than the present quartz burner. Truly it will in all respects resemble an artificial sun.

Natural sunlight is not available at all times. The qualitative and quantitative variation of sunlight is inverse to altitude, latitude, season, meteorologic changes, time of day, etc. On the other hand actinotherapy as is produced by a quartz lamp is constant and under control of the human hand. For this reason it may be employed *pro re nata—i.e.*, when occasion for the use of such treatment arises. Patients who require quartz light therapy need entertain no fear for impending storms or sunless days. During inclement weather the treatment may be given indoors. It is particularly well suited for those severely ill who cannot endure exposure to normal sun in the open. Sunlight emits only one-fourth to one-fifth the quantity of ultraviolet as is transmitted by the ordinary quartz lamp. The outfit is transportable and finds a useful appliance for ill ones at home or in hospitals.

Action of Rays.—The precise manner in which results are brought about by the use of actinotherapy is open to conjecture. Many theories exist, some of which have been proven beyond any doubt. In most instances the modus operandi is a matter of speculation. Certain established truths lend themselves to inferences, which in time it is hoped will serve as building stones for further research.

Applied in health, little effect is noted upon the organs. It seems that the light exercises a predilection for pathologic rather than physiologic states. Hess and Unger demonstrated the specificity of the rays in cases of rickets treated by the light. In their cases of rickets improvements occurred through an increase in the calcium and phosphorus content of the blood plasma. Another striking result from the use of the rays is seen in acidosis. Acidosis is dependent upon a changed hydrogen-ion concentration in the blood. This frequent condition arises when the calcium content of the body falls below normal. Again, the lime salts are at a low ebb in those conditions where an unusual demand is made upon the human economy. Pregnancy is an illustration. Here the mother has two lives for which provision is made necessary. Some authorities maintain that eclampsia results from sudden chemic changes in the blood constituents.

There is ample reason to concur with the

view recently propounded that calcium antagonizes anaphylactic reactions. The work of Kastle, Healy and Buckner is noteworthy in this respect. Urticaria, eczema, psoriasis, neurasthenia, neuralgia, chorea, asthma and osteoporosis are a few conditions which are sometimes dependent upon decreased calcium in the blood serum. Quartz light therapy is of undebatable value in raising the deficient amount of calcium in pathologic states as referred to above.

In the anemias, particularly those of secondary origin, ultraviolet light can be depended upon to restore and permanently anchor hemoglobin of the blood. Improvement often unbelievable is seen in many impoverished states of the vascular system. Another property attributed to ultraviolet therapy is that it raises the opsonic index. It also produces an active hyperemia of organs and in this manner reënforces the defensive mechanism of the body. The light increases the immunologic functions such as phagocytosis, leucocytosis, and ushers in larger numbers of agglutinins and precipitins. In this manner the patient's natural immunity and resistance is restored. Furthermore the rays will sterilize tissue, destroy bacteria, and increase the oxygen-carrying power of the red blood cells. Ultraviolet is in all probability absorbed by the superficial capillaries of the skin.

Generalized and Localized Treatment.—At the Jefferson Hospital quartz light clinic the work is conducted with the air-cooled lamp. The difference between the air-cooled and water-cooled burner lies chiefly in the fact that the latter is employed when bactericidal effect is required. Patients afflicted with psoriasis or diseased tonsils are better suited for the water-cooled method of therapy. The special arrangement of the water-cooled mechanism renders it satisfactory for cavity use. The air-cooled lamp was satisfactorily employed for most patients who applied for treatment in our department.

Methods for Quartz Light Therapy.—There are three methods for treating patients with ultraviolet light. These are (1) local, (2) general, and (3) a combination of both generalized and localized exposures. The indication for each of these procedures depends upon the condition presented by the patient. In the majority of instances either generalized systemic irradiations or the combined generalized and localized rayings is the method of choice.

1. General Method: Initial radiations commence at a distance of one yard. The patient is placed upon a table, all clothes having been removed. The length of each exposure is regulated by means of an interval timer, with an arrangement similar to the familiar alarm clock. The completion of a specified treatment is indicated by the ringing of a bell. The eyes are protected by smoked glasses and the rays are released from the hood. The shadow line is allowed to fall upon the median plane of the body, thus assuring an equal distribution of the rays. When treatment is completed upon the anterior surface the procedure is repeated posteriorly. Occasionally when several patients are to be treated for similar conditions, standing is resorted to instead of a recumbent posture. Groups of boys or girls may be treated in this manner. The latter method is particularly useful as a time-saving procedure and is applicable when a large number of individuals are to be treated in a single afternoon.

Systemic radiations commence with a fraction of one minute. Each subsequent exposure increases the duration of the rays a minute or two. At the expiration of a half month or three weeks, those patients who have been regular in attendance at the clinic receive fifteen minutes exposure upon the anterior and posterior parts of the body at one treatment. The lamp is now to be lowered. Each subsequent treatment from this time decreases the distance of the lamp one inch toward the skin surface. This procedure is continued until that time when the arc measures one foot in distance from the body. Succeeding rayings irrespective of the number continue at a distance of one foot and of fifteen minutes duration anteriorly and posteriorly.

Patients usually report on alternate days either for general or local treatments. At

some later period when the skin has adapted itself to the rays and exposures are borne favorably, treatment may be permitted as often as once a day.

In dark-colored individuals, Italians, and especially in the black race, the melanin serves as a protective covering to the penetrative power of the rays. In these instances initial exposures are somewhat longer than for individuals of the white race of similar ages. Here again it is at times possible to advance treatments rapidly. In the colored race, one is guided not so much by an actinic erythema, which is difficult to recognize, but by the sense of tenderness and itching complained of by the patient, and more particularly by desquamation of the skin.

It is our opinion that no great advantage can be derived from the fractional method of raying patients. Large numbers of individuals have received irradiations both by fractional and generalized exposures. Our method is to commence with generalized irradiations of short duration. Severe reactions are in this manner avoided and the therapeutic effect is similar to the fractional method of treatment. Timidity on the part of patients can be overcome at least in hospital practice by utmost privacy and the use of male and female assistants. Another point to be remembered is that in local treatment burns of the skin are far more frequent than from gradually increasing larger dosage by systemic exposures. When dermatitis results, a discontinuation of further treatment is advised. After several days treatment is resumed, although the initial exposure is somewhat less in duration than when the last treatment responsible for the inflammation was given. In this way one reaccustoms the skin to the rays. An interesting fact which may at first seem paradoxical is that in treating ordinary burns of first and second degrees, nothing in the way of therapy approaches that of ultraviolet. On the other hand, the severity of burns resulting from overexposure to ultraviolet radiations are aggravated by continued applications of the same rays. A possible explanation may be a difference between the type of burns. Mechanical burns are due to infra-red, while ultraviolet, which is a chemical ray, produces what might be termed a chemic injury to the skin. In other words ultraviolet antagonizes the effects of infra-red much in the same manner that atropine counteracts the physiological effects of muscarine, yet one would not attempt to employ the latter alkaloid for treating a patient, the subject of acute belladonna poisoning, without courting disaster.

A small quantity of hydrous wool-fat rubbed into the skin of infants and younger children, in which patients the derm is vulnerable, will lessen the tendency toward trauma, if used prior to raying. The lanolin inunction also prevents a great degree of tan which results from repeated exposures to the light. Wool-fat is easily absorbed by the skin and does not interfere with the penetrative ability or effective quality of the light. Chronic constipation, rickets, chronic bronchitis, secondary anemias and malnutrition are a few selected instances in which treatment is given to patients by generalized exposures.

2. Local Method: The localized method of raying is adapted to restricted lesions. Acne vulgaris and herpes zoster are examples. The localized method of treatment consists in adjusting the lamp within a distance of one foot from the part exposed for irradiation. The voltage is seventy. Initial exposure starts at one minute. Each subsequent treatment, usually on alternate days, adds one minute to that time already given at the previous exposure. The one foot distance is maintained until a sum total of eight minutes is reached. When this period has been attained the lamp distance is decreased toward the treated area, but only one inch at each exposure. The maximum duration for this and all subsequent exposures irrespective of number is eight minutes.

A series of open windows of various sizes is attached to the hood of the lamp. The apertures serve to focus small or larger quantities of ultraviolet upon areas designed for treatment.

3. Combined Generalized and Localized Method: The technique is fitted for conditions such as cervical adenitis or tuberculous arthritis.

The first part of the procedure is identical with the generalized means of irradiating patients. This is supplemented with localized exposures which are given at the same treatment. The local exposures are exactly one-half the duration of the general. As is customary in treating individuals by the generalized method, initial exposures begin at one minute, tube distance thirty-six inches, and a voltage of seventy. After the first exposure by general means the lamp is lowered to a distance of twelve inches within the treated area, and localized radiation is given for one-half minute. When treatment by generalized routine reaches ten minutes the localized exposure will amount to five minutes, and when generalized raying approaches fifteen minutes the localized treatment parallels seven and one-half minutes, etc. In other words, the localized exposures bear exactly a one-half time ratio to the generalized method.

When the fifteenth treatment has been reached by the general method the tube distance will be thirty-six inches from the body. At this time the tube distance is at the same point as when treatment was begun, the only difference being the duration of the exposure, which is fifteen minutes. The fifteenth localized exposure should at this time measure one foot in distance from the isolated area under treatment. This is the same distance at which initial treatments commenced. The fifteenth localized exposure by the combined method should not exceed seven and one-half to eight minutes.

All subsequent generalized exposures must not be given for a longer period than fifteen minutes. Similarly the remainder of localized exposures should not be administered for a greater period of time than eight minutes.

Assuming that a patient has reached the fifteenth treatment by the combined method, the attendant now prepares to increase the generalized exposures not in time but in distance only. The sixteenth treatment will be given anteriorly and posteriorly for fifteen minutes, at a distance of thirty-five inches, the succeeding treatment at thirty-four inches, the next at thirty-three inches, etc., for no longer than fifteen minutes. This scheme is followed until the tube distance is within one foot of the body. Successive exposures continue at one foot distance, fifteen minutes duration anteriorly and posteriorly, until improvement results.

After generalized radiations the attention is directed to the restricted portion of the body. Using the open window-like arrangement attached to the hood the distance is decreased toward the affected part but not in time (eight minutes is maximum). Each additional treatment which follows lowers the lamp one inch. When a proximity of three inches to the skin surface has been attained, it is advisable to continue all subsequent exposures at this distance irrespective of the further number of radiations required and for no longer period than eight minutes. Careful watchfulness of the skin should be instituted when patients are receiving the combined method of exposures. Small areas already treated by the generalized means may become severely inflamed when supplemented by localized irradiations.

It is felt that patients who receive the combined method of therapy tolerate exposures far better than when localized treatments alone are given. The following table illustrates the time relation of the localized to the generalized exposures by the combined method:

Time in Minutes.

	General.	Local.
1st treatment	..... 1 min.	½ min.
2d "	..... 2 "	1 "
3d "	..... 3 "	1½ "
4th "	..... 4 "	2 "
5th "	..... 5 "	2½ "
6th "	..... 6 "	3 "
7th "	..... 7 "	3½ "
8th "	..... 8 "	4 "
9th "	..... 9 "	4½ "
10th "	.....10 "	5 "
11th "	.....11 "	5½ "
12th "	.....12 "	6 "
13th "	.....13 "	6½ "
14th "	.....14 "	7 "
15th "	.....15 "	7½ "

Dangers of Quartz Light.—Notwithstanding the apparent harmlessness and simplicity of quartz light therapy, annoying symptoms and, in some instances, second-degree burns have resulted from carelessness in use of the rays. Because of these possibilities we have made it imperative, in the absence of a worker who is specially trained to operate the mechanism, never to permit patients to treat themselves. The most common sequelæ from injudicious regulation of actinotherapy may be summed up as follows:

1. Actinic erythema is in reality a dermatitis. It is seen particularly in the young and in the blond type of adult whose skins are tender and easily susceptible to inflammatory reaction. The inflammation is noticeable within a few hours following treatment, reaches its height in twelve to twenty-four hours, then gradually subsides. It can be prevented by avoiding what we have termed "heroic exposures"—*i.e.*, large sudden doses of irradiations from the start. When treatment has caused marked desquamation, further exposures should be suspended until healing ensues. Subsequent irradiations should be somewhat less, either in duration or distance or both, than the last treatment responsible for the injury. A small quantity of lanolin rubbed into the skin prior to exposure lessens the danger of dermatitis. Dermatitis of this nature is best treated by mild antiseptic lotions or bland ointments.

2. Combustio Bullosa or Blistering. These burns are of second degree, similar to scalding. Blisters occur within a few hours or not until one or two days after violent exposure to the rays. The inflammatory reaction is accompanied by intense pain and itching. Healing as a rule results promptly. Chemic burns are treated along the methods laid down in standard text-books on surgery. Boric acid ointment is as good an antiseptic dressing as any of the popular pharmaceutical complexities.

3. Traumatic Conjunctivitis (erythematous conjunctivitis), characterized by itching, smarting, and roughness of the eyelids. Photophobia and lacrimation are troublesome. The mucous membrane of the lids is red and swollen. It results from exposure of the bright light to the sensitive eyes and is common both to operator and patient. Conjunctivitis usually develops several hours after treatment. The condition is prevented by employing darkened eye-glasses during exposures or by shutting out the light by means of a folded towel of several thicknesses over the eyes. Infants and younger children should have their eyes encircled by a bandage. Treatment consists in the application of ice compresses, instillation of 20-per-cent argyrol from three to five drops every four hours, and in the use of smoked goggles to rest the eyes. Relief follows promptly.

4. Hemorrhage. Our experience with hemorrhagic episodes occurred in three of the patients treated, all active Koch infections. In one, an adult with chronic ulcerative pulmonary tuberculosis (moderately advanced), spitting of blood occurred for one week following two exposures. A second case was that of a boy aged thirteen with ulcerative tuberculosis of the lungs (far advanced) and a history of hemoptysis previous to treatment. Marked hemorrhages occurred throughout the course of treatment. In the third instance, a girl fourteen years of age, the lesion was complicated by bronchial asthma. Twenty-four treatments were given, with blood-spitting after the eleventh exposure. Active hyperemia induced by the rays is responsible for these hemorrhages. The three cases cited are sufficient to contraindicate the use of quartz light in active pulmonary disease. Incidentally, no improvement resulted in these patients from the light.

Two females, one a girl of about fourteen years of age, the other an adult thirty-five years of age, received generalized exposures of ultraviolet during the customary menstrual crises. Bleeding was profuse. Active congestion of the internal pelvic organs was no doubt produced. We have not had occasion to demonstrate the value of these rays in functional amenorrhea, although it is believed that the periodic menstrual flow could be enabled to return by the procedure. Menstruation and normal pre-

menstrual periods contraindicate the use of the rays.

5. Quartz fever is characterized by elevation in temperature arising spontaneously in infants and younger children. These individuals were "fever free" before treatment. No direct cause other than ultraviolet light could be found responsible for the abnormal rise in temperature. The highest temperature observed after exposure to the rays was 100.2° Fahrenheit (rectum). We were unable to determine the duration of the fever as the patients who presented the peculiarity were ambulatory cases. We attributed it to hypersensitiveness of the patient for the rays, an emotional temperament of the young, or an instability of the nervous system which is dominant at this tender age.

Cases Studied in Quartz Light Clinic.—In three hundred and sixty-five cases registered at the quartz light clinic covering a period of two years, a little less than three-fifths of the patients were followed from beginning to the end of treatment. Many more could have been included in the reported number. The writer has purposely refrained from such procedure because of the inability to trace former patients and conclude intelligently the end-results. Rather than be misled by enthusiasm in drawing erroneous inferences, these patients were eliminated from the total series. In all fairness to light therapy it should be stated that in the vast majority of the last mentioned group of patients, and also in those at present under active treatment, the latter not included in this report, beneficent results have nevertheless been apparent. The regular attendance of our patients, and the long hours consumed in awaiting their therapy despite the handicap of only one quartz lamp in use at the clinic, are to our minds evidence of utmost confidence in the new method of restoring health.

Cases were referred to the clinic from former patients who had received treatment previously and had recommended the treatment highly. Incidentally these patients constituted our largest number. The remainder of patients studied were derived from our own hospital and various other clinics of the city. Emphasis should be stressed upon the fact that in many instances these patients received the usual medication of one kind or another without marked improvement prior to quartz light treatment. This statement is made not with the intention of belittling drug therapy, but merely as proof that in artificial heliotherapy the physician finds an adjunct to treatment not benefited by usual routine care.

In a certain few with apparently hopeless disease, the lamp was suggested as a sheet-anchor or as a method of last resort. As might be expected in these cases the light did not materially influence the course of disease, although in many instances secondary symptoms abated or improved. Malignancy is a good example.

Progress in the patients studied was reported by clinical means. General statements taken at face value, interrogation of patients by means of their symptoms and observation by physical signs were mainly the methods followed to determine improvement. Time did not permit us to enter into exhaustive Roentgen studies and laboratory tests. Our findings are, therefore, in a strict sense of the term observations based upon clinical improvement. Those patients who after a month of routine treatment showed no headway in progress were ordered to discontinue quartz light therapy. We felt justified in suspending treatment in these patients after the fifteenth or twentieth exposure on the grounds that, were the light effective, results even to a slight degree would have been noticed within that time. During the two years' study a sum total of over twenty-five hundred visits were made by patients included in this paper. This would yield about twelve treatments per capita.

The cases studied are reported as follows: (*a*) Definitely improved, (*b*) unimproved, (*c*) doubtful. Each patient who was indorsed for light therapy underwent a physical examination prior to acceptance by the special department.

1. Chronic bronchitis. Those patients, irrespective of age, who presented coughs

for periods of one month or longer. Most of the cases in this group gave a history of an intermittent cough for years. Those included under the above classification were further divided into (*a*) simple, non-tuberculous bronchitis and (*b*) tuberculous bronchitis. The latter subdivided itself into chronic ulcerative pulmonary tuberculosis, active and inactive, and hilum tuberculosis.

(*a*) Simple non-tuberculous bronchitis. Total number of cases studied, fifty-seven. Of this number there were forty-five children, eleven infants, and one adult. The forty-five children comprised twenty-six boys and nineteen girls. Forty-four cases showed definite and complete improvement; one child showed no improvement. Of the eleven infants, four were males, seven females. All of this group improved. The adult male, past the half-century mark, showed no improvement. Treatment consisted of generalized exposures.

(*b*) Chronic ulcerative pulmonary tuberculosis. Total number of cases five, four active, one inactive. Of the four active, two were adult females and two older children, one male and one female. In all four cases no improvement resulted from routine systemic radiations for at least one month. The inactive case occurred in a fourteen-year-old girl. No improvement after six weeks with ultraviolet by means of generalized exposures.

(*c*) Hilum tuberculosis. Total number of cases, seventeen—sixteen children and one infant. Of the sixteen children, ten were males—six females. Of this number thirteen improved, two showed unimprovement, and one was considered doubtful as to apparent improvement. The female infant improved. Method was by means of generalized exposure.

Comment.—From the series of cases presented we are inclined to believe that the greatest number of patients benefited by ultraviolet exposures are those of the non-tuberculous form. The rapidity with which these patients lose their coughs (in many these coughs were of long standing) is remarkable. Incidentally there is a gain in weight, appetite increases, and a feeling of well-being ensues. It is felt that next to rachitis and allied conditions, the greatest usefulness for ultraviolet medication is to be found in those patients afflicted with simple chronic bronchitis. It is interesting to learn of the disappearance of frequent and repeated colds common to children when treated by quartz light.

In our cases of chronic ulcerative pulmonary tuberculosis radiations were given over varying periods of time without noticeable improvement. In one of the active cases complicated by bronchial asthma, repeated hemorrhages were experienced by the patient. In a lad of thirteen years with far advanced lesions resembling the adult type of disease, hemorrhagic episodes prevailed throughout the course of exposure. Death followed shortly after treatment was discontinued. In a third instance, that of an adult with active tuberculosis, blood-spitting occurred each time immediately following irradiations and ceased upon withdrawal of treatment. These phenomena are interesting. In view of the fact that calcium in the blood plasma is below normal in tuberculosis and inasmuch as one of nature's methods of repairing diseased tissue in tuberculosis is by means of a deposition of lime salts, one would expect ultraviolet therapy to overcome the calcium deficiency as in rickets, etc. We are at a loss to explain the reason for the opposite condition which exists by ultraviolet raying in patients with pulmonary tuberculosis. It is possible that the time factor is a point to be considered. Our patients were discharged after fifteen or twenty exposures in which no apparent improvement was seen.

The hemorrhagic occurrence can be explained by the fact that ultraviolet induces an active hyperemia in organs. Active Koch lesions contraindicate the use of actinotherapy. This rule applies to acute inflammatory conditions in any organ. Although it is not possible to draw definite conclusions from the few cases treated with the light, the one hundred per cent of failure in these patients discourages further use of these rays in chronic ulcerative pulmonary tuberculosis.

Chronic cough resulting from enlarged tuberculous glands at the root of the lungs

showed fairly good results by quartz light. Contrasting these cases with the coughs dependent upon the true ulcerated types of the disease, a marked difference in results becomes apparent. Again we are at a loss to render a plausible solution of the problem. Several possibilities present themselves. Among these might be mentioned a difference in site of lesions, virulence of disease, and mode of infection.

2. Acute bronchitis. Total number of cases three. Two infants, one male and one female, and one older male child. Improvement in all. Systemic treatment.

Comment.—Primarily acute bronchitis is a self-limited disease. It is unfair to judge results from the three cases presented, although the rays proved of value in these individuals. Cough disappeared after comparatively few exposures. Improvement is probably brought about by an increase in the immunologic bodies induced by the rays. It is doubtful whether the near ultraviolet possesses any direct selective action upon microbes. Penetrative power of quartz light into tissue is slight.

3. Tuberculosis. With the exception of tuberculous chronic bronchitis and hilum lesions, which have already been discussed under the general heading of bronchitis, twenty-two cases of Koch infections were treated with the light. Of these patients three presented tuberculosis of the peritoneum. Three females included a young girl, an older girl, and a child. In the four-year-old child the abdominal condition was part of a generalized tuberculous infection. Improvement followed in all.

Two cases of intestinal tuberculosis were studied in a male of thirty-one years, and in a female of twelve years. The male showed no improvement, the female recovered completely.

Two patients received actinotherapy for Pott's disease, one male two years and one female five years. Improvement in the male child was considered doubtful. Definite improvement followed six months' radiation in the female. The patient was then sent to the seashore for convalescent care.

Two patients were exposed to the light for osteomyelitis. A female of sixteen years gave a history of tuberculosis of the left femur for four years, with little improvement from surgical intervention. Definite improvement followed ultraviolet exposures. A male thirty-six years old with long-standing Koch disease of the right tibia improved remarkably from quartz light. Treatment consisted of localized exposures.

Two patients presented tuberculosis of the skin. A colored female twenty-five years of age demonstrated little improvement from the treatment. A male of thirty-one years definitely improved. Treatment—generalized exposures.

One woman, forty-two years old, of Italian parentage, came to the clinic with a diagnosis of Addison's disease. She had all the typical landmarks of the disease. Radiations were continued for three and one-half months without improvement. The patient grew progressively weaker and died. Treatment—generalized exposures.

Ten cases of cervical adenitis are recorded at the clinic. These include three infants and seven children, eight males and two females. Improvements, eight; unimprovements, two. Treatments combined systemic and localized exposures.

Comment.—Tuberculous lesions other than those involving the lungs improve satisfactorily by light therapy. The three cases of peritonitis contained fluid in the abdominal cavity. Paracentesis abdominalis was performed by the surgeon prior to treatment with the rays.

In intestinal tuberculosis, the first sign of improvement is seen in a decreased number of bowel evacuations. Gain in weight and increased appetite without abdominal distress after ingestion of food are outstanding signs which indicate improvement in health. The writer has seen intractable diarrheas of this nature accompanied by tenesmus rapidly benefited by quartz therapy. In these patients opiates had not the slightest effect in controlling the condition.

In Pott's disease as well as in osteomyelitis, repair occurs principally by calci-

fication of diseased bone. These patients require many months of routine treatment before worth-while results are seen. *X*-ray studies determine whether or not repair is progressive. After the first few exposures patients with osteomyelitis experience increased pain and tenderness about the discharging sinuses. This is followed by expulsion of one or more sequestra, which results in relief of pain.

Sequestra have been eliminated during irradiations, a few hours after treatment, or not until one or more days after exposure to the rays. It would seem that ultraviolet exercises a magnetic-like attraction for diseased tissue. The amount of serum and pus which emerge from sinuses under the influence of the rays is most remarkable. Sometimes many months elapse before sinuses are completely healed.

Lupus calls for the use of the water-cooled lamp rather than the air-cooled variety of mechanism. Most cures in these diseases have been obtained through the bactericidal action of the far rays as is produced by water-cooled light.

Cervical adenitis is admirably adapted for quartz light therapy. Best results in these cases are obtained before suppuration has occurred. In the vast number of these patients ultraviolet medication alone can be relied upon to reduce the nodular enlargements to insignificance. Less than six exposures will usually cause an appreciable decrease in size of the glands. When suppuration has taken place, treatment by surgical means becomes necessary. After incision free drainage is accomplished by the usual method of localized exposures.

4. Simple cervical adenitis (non-tuberculous). Total number of cases twelve: one male adult, three infants, and eight children, consisting of four females and seven males. Definite improvement in all cases. These cases were in the majority of instances dependent upon nose and throat infections. In one patient an eczema of the scalp caused enlargement of the posterior cervical glands. In all instances where diseased tonsils were responsible factors, removal of the diseased tissue was advocated. Treatment—generalized and localized exposures.

5. Rachitis. These cases were divided into early and far advanced forms of the disease. The classification is only an arbitrary one which differs chiefly in the degree of intensity in symptoms and signs. Seven cases of early rickets occurred in infants, four males and three females. Definite improvement was noticed in all patients. The remaining cases presented far advanced lesions. This group included ten infants and five younger children. There were four females and eleven males. Definite improvement in all patients. The treatment consisted of generalized exposures.

Comment.—The specificity of ultraviolet in rickets has been demonstrated repeatedly by various investigators. The works of Hess and Unger deserve special mention. It has been shown that animals fed upon ricket-producing diets but exposed to quartz light or natural sunshine do not develop rickets. It has been further demonstrated that the therapeutic effect of quartz light exposures is equivalent to the administration of cod-liver oil in preventing and curing this disease. In light therapy the physician finds another specific which ranks close to mercury and arsenic for the treatment of lues or quinine for combating malaria.

6. Chronic constipation. Total number of cases ten: four infants, two younger children, two older children, and two adults. Of this number there were four females and six males. Definite improvement occurred in eight; unimprovement in two. Treatment consisted of generalized exposures.

Comment.—Costiveness in many instances can be overcome by ultraviolet medication. This condition was first brought to our attention by the studies of Synderman, who employed the light with the view of changing the bacterial flora of the intestinal tract. In view of the facts that most mothers abhor the perpetual administration of laxatives in the young and because suppositories or enemas are injurious and habit-forming from prolonged use, radiation with quartz

light forms an efficient substitute for these common practices. A possible explanation of the action is that the light increases the muscular tone of the intestinal tract, which is normally poor at this age.

7. Secondary anemia. These cases were divided into two groups. The first group included anemias dependent upon poor nutrition. The infants and children in this group were underweight. The patients of the second group measured up to standard weights but presented marked pallor of the mucous membranes. Diagnosis was based purely upon symptoms and physical findings.

The group associated with malnutrition consisted of twelve patients; seven children and five infants; eight males and four females. Of this number ten definitely improved, two showed unimprovement. Those without malnutrition numbered ten. Among these there were five children and five infants, three females and seven males. Improvement in all except one. Treatment consisted of generalized exposures.

Comment.—Doubtless many writers would classify anemia in patients dependent upon undernourishment as pretuberculous children. The author has purposely omitted the term "pretuberculous" from this classification because he believes the expression a cloak for indefiniteness in diagnosis. He is, however, aware of the fact that many children who are undernourished are oftimes predisposed to the disease or have latent tuberculosis. A child either has or has not tuberculosis, and to speak of a pretuberculous child is just as faulty as to say a child has a "touch of pneumonia." It would probably be better in those suspicious cases to state that there is a tuberculous tendency.

These children, in addition to the signs enumerated above, gained weight slowly by the usual and customary methods of feeding. Many presented perverted appetites. Others gave a history of frequent and repeated colds and fatigue. Physical examination demonstrated suggestive signs of early pulmonary (hilum) or glandular disease. Most of these children had a natural dislike for milk and eggs. It was surprising how rapid were the strides in these children in weight gain, in increase in appetite and decrease in pallor from ultraviolet light exposures.

It has been definitely established that ultraviolet irradiations will increase and fix the hemoglobin of the red blood cells. In these patients the light treatment might properly be considered as an efficient analeptic. This does not infer that quartz light can replace food, but by some mechanism of its own as yet not clearly understood will readjust deranged functions. Most assimilable calcium enters the body through milk and vegetables. Egg-yolk and vegetables abundant in iron serve to supply hemoglobin to the blood. In many impoverished and diseased conditions, where common food elements such as those enumerated cannot be tolerated by patients, ultraviolet light properly administered serves as a satisfactory substitute.

8. Multiple arthritis (so-called rheumatism). All cases studied were other than those caused by the tubercle bacillus. Total number of cases eight, divided into those without endocarditis and those showing evidence of endocardial involvement. Those with endocarditis included three patients, all males—one infant, one younger and one older child. Only one improved; the other two showed no improvement. Those without endocarditis totaled five; three adults, two older children—three females and two males. Improvement in one, unimprovement in four. Treatment consisted of generalized and localized exposures.

Comment.—The poor results with this group of patients are probably due to treatment with the air-cooled instead of the water-cooled lamp. All cases were of long standing, and in all patients except three enucleation of the tonsils was performed prior to our work with the rays. It seems that other investigators have obtained far better results with arthritis.

9. Acne. Total number of cases five: one adult, four older children—two females

and three males. The cases included papular and pustular lesions with and without comedones. Four patients definitely improved, one considered doubtful. Treatment consisted of localized exposures, anteriorly and upon right and left lateral aspects of the face, either in sitting or standing posture. The maximum duration of the rays was for a period of five minutes.

Comment.—These patients require many exposures before good results are seen. For a time old lesions disappear and new ones redevelop. Worth-while effects from the rays are not produced until the skin is fairly well tanned. In the doubtful case reported, rapid improvement occurred after several injections with an autogenous vaccine. Because dermatitis is prone to result from overexposure, and for the reason that many of these individuals object to the discoloration, it is best to radiate the skin for no longer than five minutes at regular tube distance.

10. Furunculosis. Total number of cases two, in male infants. No improvement. Treatment—generalized exposures.

Comment.—These patients were afflicted with multiple furuncles. The water-cooled lamp for its bactericidal effect should have been used instead of the air-cooled variety.

11. Alopecia areata. Total number of cases three, all male adults. Alopecia was non-specific in these patients. Two improved, one unimproved. Treatment—localized exposures.

Comment.—Perseverance and patience are required before results are seen. In one case, that of a medical student, a fine downy growth of hair was noticed after the forty-second treatment.

12. Eczema rubrum. Total number of cases two, in male infants, with unimprovement in both. Treatment—combined generalized and localized exposures.

Comment.—The bactericidal properties of the ultraviolet as furnished by the water-cooled lamp should have been employed.

13. Scleroderma. One case in a male child. Treatment — generalized exposure. Pigmentation regained, skin texture (hardness) unimproved.

14. Pernicious anemia. One case in a male adult. Treatment — generalized exposures. Apparently improved while under observation.

Comment. — Two venous transfusions were performed before radiation with ultraviolet.

15. Enlarged thymus. Two female infants, with improvement in both. Treatment—combined generalized and localized exposures.

Comment.—The action of ultraviolet in these cases is similar to the *x*-rays. Improvement is usually noticed after six or more exposures.

16. Achondroplasia. One case in a female infant in which a mistaken diagnosis of rickets was made. Definite and complete recovery with generalized exposures.

17. Burns. Two females, one eighteen years with a burn of the arm, the other forty-eight with a second degree burn of the forearm. (*X*-ray.) Definite and complete improvement by localized exposures.

Comment.—The writer has had occasion to follow treatments by the rays for burns of first and second degrees. These burns heal promptly. Whether the rays antagonize the toxins engendered by devitalized tissue or whether healing ensues by a deposition of lime salts about the injured area, is problematic. However, as an effective agent in repairing burns, drug therapy is far inferior to that of ultraviolet.

18. Other conditions. One case of malignancy of the larynx in a male, aged fifty-one years, who received systemic and local exposures. The condition itself remained unimproved. After twelve exposures the pain complained of by the patient became lessened and pallor improved.

Two cases of Little's disease in one male infant and one female child three years old. Unimprovement from systemic irradiation.

Three cases of bronchial asthma in two males and one female respectively. Generalized exposures. There was no improvement in severity or frequency of the acute attacks; however, it seemed as though the rays exercised an expectorant effect. Large quantities of sputa were expelled from the

bronchi following treatment. Appetite improved, but gain in weight did not follow.

Comment.—It is impossible to draw logical conclusions from the asthma patients. Asthma is dependent upon a multiplicity of factors. In those cases in which calcium of the blood is diminished the blood serum can be replenished with this element by ultraviolet therapy.

Three cases of chorea occurred in two males and one female—all children. Results doubtful; generalized exposures.

Comment.—Improvement often follows when hygienic treatment alone is employed. It is impossible to definitely state that an absence of nervous manifestations which followed irradiations were due to ultraviolet.

Two cases of epilepsy in male children. Improvement considered doubtful; generalized exposures.

Comment.—The attacks are certainly not lessened in frequency nor reduced in severity by this means of treatment.

One case of infection of the abdomen which followed appendectomy. Female, sixteen years of age. Definite and complete drainage of infected wound with closure of the incision by scarification. Complete restoration to health.

Comment.—The ability of ultraviolet to adequately drain infected areas cannot be disputed. This has already been referred to in speaking of tuberculous sinuses and suppurative adenitis.

One case of internal hydrocephalus in a male child three years old. Generalized and localized exposures. Unimprovement.

SUMMARY AND CONCLUSIONS.

Two hundred and ten patients were studied by means of mercury-vapor quartz light. These patients were followed from the beginning to the end of the therapy, and included one hundred twenty-seven males, eighty-three females—61 infants, 127 children, and 22 adults.

The total number of improvements was 164, with 40 unimproved, and 6 in which the result was considered doubtful.

Exposures consisted of generalized or localized radiations or a combination of the two methods.

Because of a limited number of conditions treated at our clinic, it would seem unfair to evaluate and judge end results with any degree of certainty. Until corroborative data are forthcoming from independent sources, the much discussed drugless means of therapy should neither be unduly lauded nor hastily condemned.

From our series of cases studied and reported instances of other investigators it seems reasonable to conclude as follows:

1. Artificial heliotherapy may be considered a specific in rickets, spasmophilia, and tetany.

2. Mercury-vapor quartz light is of distinct value in chronic bronchitis of nontuberculous origin.

3. It possesses a tonic effect in such generalized conditions as malnutrition and secondary anemia.

4. In localized entities it is employed with striking advantage in cervical adenitis, whether simple or tuberculous, chronic constipation, acne, burns, and enlarged thymus. In some forms of tuberculosis it is particularly useful.

5. Ultraviolet medication is not a panacea but a definite aid to the physician in many conditions where the administration of drugs is attended with difficulty. This is especially true during early life when the use of medicaments induces fright, provokes gastric disturbance, and gives rise to the common expression "the medicine is worse than the disease itself."

6. Lastly, artificial heliotherapy finds a useful place in many instances where drug therapy has taxed the patience of both physician and patient in having failed to accomplish noticeable improvement.

It is not surprising that a large variety of conditions lend themselves readily to this means of treatment. When one recalls the important rôle sunlight plays in metabolism and its necessity for general health, one can reasonably understand its value as a therapeutic agent.

No matter what attitude is assumed regarding quartz light therapy, the clinical fact remains that the majority of patients in our series of cases improved from the treatment.

Actinotherapy is by no means the last word in modern therapeutics. Quartz light simply adds another instrument of precision in the hands of the physician when treating those ailments generally not benefited by ordinary means.

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A Modern Belladonna Plaster

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The persistence through the ages of the use of the plaster in therapy, while hundreds of other forms of medication have been discarded, indicates an inherent merit.

In this the twentieth century of our era, two forms of plasters have a larger use than ever before in the history of mankind. These two forms are the universal adhesive plaster applied in surgery and in medicine for its mechanical and therapeutic effects, and the belladonna plaster, which is an adhesive plaster plus the addition of belladonna medication.

The Making of a Belladonna Plaster.—The first crude form of medicated plaster was made by smearing the juice of the drug upon a leaf or skin to form a poultice-like application. Later came the combination with gums. For more than twenty centuries the diachylon, or oleate of lead, mass formed the base of these applications.

The value of such a plaster is enhanced many fold in the modern method of making.

The present-day belladonna plaster is made up of adhesive substances such as picis burgundica (burgundy pitch), gum olibanum, plastic caoutchouc, waxes, and fats; an excipient or vehicle (usually orris) is added to give consistency, and as a medium for the exhibition of the other ingredients.

A most important component is the plastic rubber. It has been supposed, erroneously, that such a substance would prevent the absorption of the drug. Quite the contrary is true. The rubber used is the natural gum untreated, except for purification and grinding until very plastic and adhesive. The belladonna or other drug incorporated into such a mass is not absorbed or held in the rubber and resins, but every molecular particle of the mass is covered by a film of the contained drug, and when applied to the

body the mass literally sinks into the pores of the cuticle, carrying the incorporated medicament into every cell.

The presence of the plastic rubber affords a property not known in the older form of plasters. It is adhesive at the temperature of the body, without warming; it gives a close contact of the plaster mass and the contained drug with the skin. Notwithstanding its superior adhesiveness the plaster can be removed without disturbance of the cuticle.

The plaster mass containing plastic rubber is the outstanding forward step in modern plaster making. From the first crude methods of using the juice of the green plant have come the advanced methods of extracting the constituents of the drug.

Standards for Belladonna Plasters.—Through the ages formulas for plasters made of belladonna or allied solanums appear continuously in the "handbooks," herbals, dispensatories, pharmacopœias, and text-books.

The importance of belladonna plasters in the present era is shown in the fact that they are officially recognized in the following pharmacopœias:

British Pharmacopœia, 1914.

Farmacopea Chilena, 1905.

Pharmacopee Francaise Codex Medicamentarium, 1908—Supplement, 1920.

Pharmacopœa Helvetica, editio quarta, 1907.

Farmacopœa official Espanol, septima edicion, 1915.

Farmacopea Latino-Americana, 1920.

Farmacopea Mexicana, cuarta edicion, 1904.

Farmacopea Venezolana, 1910.

Pharmacopœia of the United States, Tenth Decennial Revision, 1926.

British Pharmaceutical Codex, 1924.

The standard set for belladonna plaster by the United States and British Pharmacopœias, and which works out in intent in other official formulas, amounts approximately to 0.25 per cent total alkaloids of belladonna. Thus there is a fairly uniform standard for this plaster throughout the world.

Plaster Action.—The action of a belladonna plaster when applied to the surface of the body is manifold. Briefly, there is a covering and protection of the part; there is a compression and support of the underlying tissues, giving a gentle, continuous massage of the entire area covered.

This action of a modern plaster—compression, support, limitation of motion, and massage—has been overlooked. Such action is due in the larger part to the fact that the mass is plastic and adhesive at body temperature, and is elastic.

Through this continuous action the normal functions of the tissues beneath the plaster are stimulated; tension, pain, swelling and inflammation are relieved; the absorption of inflammatory and non-inflammatory fluids, pus and congested blood is promoted.

In addition, the modern plaster, with its plastic adhesive mass of caoutchouc and other gums, has a mild cataplasmic-like action. The epidermis is macerated and softened to a slight degree, producing a feeling of warmth, stimulating circulation, and the cuticle membrane is prepared for the absorption of such a drug as belladonna.

That belladonna, when applied to the skin, is absorbed, and there then follows the usual effects of the drug, is a well-established fact in medicine.

That the physiological and therapeutic effects of belladonna follow the application of a modern belladonna plaster has been established in many ways.

The General Medical Council of Great Britain unintentionally and unconsciously proved that belladonna is absorbed from a plaster mass. In the fourth British Pharmacopœia the standard for belladonna plaster mass was placed at 0.5 per cent alkaloids. By reason of complaints of untoward action of plasters of this strength of belladonna, the Council was obliged to reduce the standard by one-half, or to 0.25, which standard has been retained in the fifth and latest revision.

In a certain number of unusual cases reported in medical literature, the application of a belladonna plaster to the unbroken skin has resulted in an absorption of belladonna sufficient to produce dryness of the throat, dilatation of the pupil of the eye, redness of the skin, and, in a mild degree, other manifestations of the action of belladonna when taken internally. These cases, fortunately of infrequent occurrence, and in persons peculiarly susceptible to the action of belladonna, are sufficient in number to prove the action.

Dr. Frank Crozer Knowles (address before the Northern Medical Association of Philadelphia, November 24, 1910) reviewed the literature on the subject of eruptions, etc., caused by the internal and external use of belladonna, and reached the conclusion that absorption may follow the application of a belladonna plaster causing untoward symptoms; that the skin does not have to be broken or denuded of epidermis for absorption to take place.

Bastedo and Martin, in a report of experimental clinical application of belladonna plasters for the relief of local pain, reached the conclusion that such plasters had distinctly more power to stop pain than the simple plaster without belladonna.

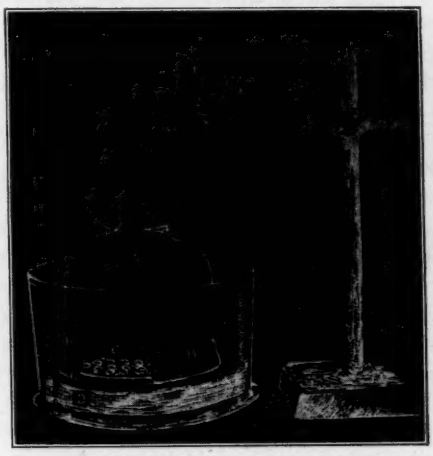
Proofs of the absorption of belladonna from the plaster are, in a certain sense, commonplace. In fact where belladonna is applied locally there follows an anesthesia over the area of application. Its action here is relief of peripheral irritation, acting as it does upon the seat of the morbid process.

The action of belladonna as a depressant of glandular activity is well shown in the application of a plaster in drying up the secretions of milk, when for any reason it is desired to do so. Here the application of a belladonna plaster is a common practice. In these cases the belladonna is absorbed from the plaster and acts by depressing the ends of the sensory nerves of the nipples, so they cannot reflexly excite secretions. There is likewise a retardation of osmosis from the capillaries. These actions could not take place unless the drug was absorbed from the plaster mass.

The absorption of belladonna from a modern plaster is to be expected. At the temperature of the body the plastic adhesive mass sinks into the epidermis, filling each cell and bringing a film of the drug in close contact with the membrane. The fact that the contained belladonna is soluble in the tissue fluids and that the plaster mass is not soluble aids the absorbing action.

The absorption of belladonna from a plaster mass is shown by the following laboratory experiments.

That the belladonna contained in a belladonna plaster will pass through a membrane



The dialyzing apparatus used in demonstrating the absorption of belladonna through the skin consists of a bell jar (A) open at the top, the bottom of which is covered with gold-beaters' skin (B), representing the skin tissue. Inside the jar a portion of a belladonna plaster (C) lies face downward upon the membrane. The whole is floating in normal salt solution (D) representing the tissue fluid. The active principles in the belladonna plaster (C) pass through the membrane (B) into the fluid (D), representing the absorption of belladonna through the skin.

resembling the human skin has been demonstrated in the writer's laboratory. Omitting the technical details, the experiments may be briefly summarized as follows:

Over the bottom of a dialyzing cup (a bell jar with an opening at the top), gold-beaters' skin was stretched and fastened. This membrane is fairly representative of the human skin. Through the top opening of the bell a belladonna plaster was placed in

such a way that the plaster mass lay upon the membrane. This represented a plaster lying on the skin. The cup and plaster were then suspended in a flat dish containing a dialyzing liquid—a normal salt solution. The liquid laving the membrane represented the fluids of the tissues underneath the skin. Allowing the fluids in the cup to lave the outside of the membrane in the cup for varying periods, the dialyzing fluid was found, upon assay, to contain belladonna alkaloids in appreciable and measurable amounts.

Under these conditions the constituents of the belladonna plaster could only reach the dialyzing fluid by passing through the skin-like membrane. Under the dialyzing process, continued for six days (twenty-four hours each), about one-fourth of the belladonna alkaloids passed through the membrane into the fluid.

As nearly as it can be portrayed in a laboratory, this experiment represented exactly what happens when a belladonna plaster is applied to the skin over a painful spot. Through the action of the fluids in the tissues, the constituents of the belladonna in the plaster mass are carried through the skin membrane to the irritated nerves. The anodyne action of the drug quiets and relieves the pain.

The experiments were corroborated by animal experiments which may be summarized as follows:

Dogs weighing about thirteen pounds were shaved on the abdomen from the front to the hind legs and strips of belladonna plaster applied. The plasters covered the shaved portion of the body, except that portion between the mammary glands. Bandages were applied to hold the plaster in place, and the animal placed in a cage and fastened in such a way as not to allow the plaster to be licked.

The urine of the animals was collected at the end of twenty-four-hour periods, and the temperature taken.

The urine fractions from two of the animals when applied to the eyes of a cat gave positive results for mydriasis.

Local Action of a Belladonna Plaster.—The therapeutic application of a belladonna plaster is not within the province of the writer.

For the most part, authorities in writing upon belladonna plaster simply record the results of such action without attempting to explain the mode of action.

Omitting the details and references of such reports as have been recorded, the following may be taken as a brief summary:

"Belladonna, when applied locally in quantities too small to produce constitutional disturbances (as in a plaster), can cause appreciable as well as useful actions upon the following mechanisms: (1) The sensory mechanism; (2) the motor mechanism; (3) the secretory mechanism; (4) the ocular mechanism (this last only under certain conditions with a plaster)."

Observers have shown that a belladonna plaster, while having no action on the receiving sensory centers, has a marked anodyne or depressant action upon the ends of the sensory nerves.

The local action of belladonna applied in the form of a plaster dulls rather than paralyzes sensory nerves.

This latter action of belladonna is the one by which it is best known. It is through this action that the relief of pain follows the application of a belladonna plaster. Applied directly to the area of pain, the drug is brought into contact with the nerves that are irritated, and relief follows.

Through this action a very small amount of belladonna acting directly upon the peripheral irritation produces a greater result than a larger dose taken internally and mixed with the whole quantity of blood and carried to other parts of the body besides the seat of pain.

Quite universally reports have shown that, through this action, a belladonna plaster has been found "an efficient means of relieving the pain of intercostal neuralgia, pleurodynia, lumbago, and the various forms of myalgia. The irritability of the chest muscles in phthisis, and the pain from old adhesions in pleurisy are relieved by the

application of belladonna plaster. The pains in gout and in chronic rheumatism are likewise relieved." (Caldwell.)

The action of a belladonna plaster as a depressant of glandular activity is well known, and remains a striking and useful application.

When it is found desirable to dry up or check the flow of milk in the mother's breast, the application of a belladonna plaster diminishes the secretion without producing other actions on the system.

Physiologically this is explained as follows:

"Belladonna arrests the secretion of milk, first, by depressing the ends of the secretory nerves so that the gland is partially cut off from the influence of the milk center. It also probably lessens osmosis. Second, by depressing the ends of the sensory nerves of the nipple so that they cannot reflexly excite secretion."

The Lay Use of Belladonna Plasters.—Through the centuries, in all countries, belladonna plasters have been used as a home remedy. This long-continued use by the laity is in one way a witness to the fact that they do give the wearer relief in certain disorders, else their use would not continue.

The application of belladonna plasters by the laity, while often irrational, is not harmful or productive of untoward results. It has been found that out of the millions of belladonna plasters applied, at most only two or three cases of mild mydriasis, constriction of the throat or other unusual symptoms have been reported.

This would indicate that this form of lay therapy is at least more safe than indiscriminate dosage of powerful drugs, habits which the laity in these days are very prone to pursue. In the use of belladonna plasters by laymen there is no danger of forming drug habits.

Physicians have reported that while the laity are apt to attribute to plasters unwarranted merit, their use gives the wearer a sense of security and relief, and the action of the plaster in no way interferes with other forms of treatment.

Therefore, in part for psychological reasons, in part for the actual results obtained, many practitioners find it advisable to prescribe belladonna plaster as an adjunct to other methods of treatment. Inasmuch as the laity are prone to self-medication, a belladonna plaster is a safe and reasonable form for lay application.

Belladonna Plaster Action.—Practitioners who have made close observation as to the action of belladonna when administered in plaster form, call attention to distinguishing characteristics between the action when thus applied locally and when administered through the mouth.

When belladonna is administered through the mouth its action is rapid and the resulting symptoms marked and prompt. When administered in plaster form the active principles of the drug are absorbed through the intact skin, but slowly, continuously, regularly, in uniform but small proportions or dosage.

The action of the drug is not cumulative, it having been established that belladonna, except where large amounts are administered, is rapidly eliminated, mainly through the kidneys. Examination of plasters which had been applied and the action of the drug followed, has shown that a proportion of the contained belladonna had been absorbed into the tissues.

The action of a belladonna plaster has been compared as analogous to a continued administration of a high dilution of the drug through the mouth, with the notable exception that with the plaster the action of the drug is direct upon the part to which applied, whereas in administration through the mouth the drug is carried through the whole system.

Herein is noted only the briefest record of the nature of a modern belladonna plaster. The place, the purpose and the value of such an application can only be determined by the physician, and the writer believes that wherever such an application may be called for the physician will find that the modern belladonna plaster will give a uniformity of action and efficiency.

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Obscure Pyrexias of Childhood

BY JAMES W. BRUCE, M.D.
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The diagnosis of disease in early life presents obvious difficulties. The child cannot give a clear statement of its case; it cannot localize pain accurately; its memory of duration and sequence of symptoms is vague.

The case history in a child less than five years of age consists of the observations of its mother. These observations are sometimes surprisingly keen, and sometimes equally indefinite. The physician has to depend mostly on his own examination, and this is often conducted under the most adverse conditions.

The majority of young children are afraid of strangers, and most of all doctors, either because their mothers have foolishly threatened to "call the doctor" if they did not behave themselves, or because of some painful experience, such as opening a boil or having the throat treated.

The examination is much more difficult if the child is suffering from febrile disease, which of course increases its irritability and suspicion. It is impossible to examine a screaming, fighting child. These difficulties have tempted us to describe the cause of fever to the first abnormality which might be encountered.

For the first two years of life the teeth are generally in process of eruption, and "teething" is a diagnosis which has been greatly overworked. Teething undoubtedly does cause fever, but one should be careful to make that diagnosis only after repeated thorough examinations have failed to reveal any other cause.

"Intestinal indigestion" is another cause to which we are prone to ascribe obscure fevers. Intestinal indigestion can undoubtedly cause fever, convulsions and death in children, and is probably the commonest cause of fever which one encounters; but its very frequency has tempted us to assign to it a primary rôle when further examination might have revealed something else to which it was secondary.

Fever due to anything, *e.g.*, pneumonia, pyelitis, otitis media, etc., can cause intestinal indigestion, because the digestive juices do not function properly in the presence of fever. Undigested stools are the rule rather than the exception in febrile disease of any character.

I wish to direct attention to three diseases which are rather common in young children, and which we are prone to overlook because of the difficulties already referred to and because they usually show no localizing symptom or sign. These are: (*a*) lobar pneumonia, (*b*) pyelitis, and (*c*) otitis media.

Bronchopneumonia is not as a rule difficult to diagnose. It may be impossible for a day or two to determine whether the little patient has severe bronchitis or bronchopneumonia, but there are always physical signs in the chest and cough that point the way clearly to the lungs as the site of the disease.

Lobar pneumonia, on the other hand, can be and frequently is an absolutely silent disease. The onset is usually abrupt, sometimes occurring with convulsions, but more commonly it is not as sudden as in adults. Sometimes the child seems merely indisposed for the first day or two, and I have seen several cases where the mothers could not say definitely what day the illness began. The initial chill is rarely seen. Cough, while usually present, is not distressing, and often is so mild as to not attract attention. Cough becomes more pronounced as the disease progresses, and by the fifth or sixth day is usually an outstanding feature. Dyspnea is characteristic of all febrile diseases of childhood, and its presence does not necessarily indicate pulmonary involvement. A pulse-respiration ratio of 2½ or 3 to 1 can often be seen in high fever from any cause.

On the other hand, many patients with lobar pneumonia are dyspneic, and show the normal 4 to 1 ratio. Pain in the side or chest is much more frequently absent than present and rarely is severe enough to require poultices. Physical signs of consolidation, *e.g.*, bronchovesicular breathing and dulness, are nearly always late in appearing, often not until the day before or the day of the crisis. This is the chief reason why the diagnosis of lobar pneumonia is so difficult, for we cannot say definitely that pneumonia is present until we can "hear it." Also the signs frequently do not involve an entire lobe, but can only be heard over an area the size of a silver dollar.

The following brief case reports will illustrate the foregoing points:

Case 1.—A boy, aged seven years, admitted to the children's ward of the Louisville City Hospital with temperature of 104° F. There was no dyspnea or cough; child did not appear very ill; did not want to remain in bed. Physical examination entirely negative. Leucocyte count 20,000; polymorphonuclear leucocytes 80 per cent.

On the fifth day of the disease, as lobar pneumonia was suspected, a roentgenogram of the chest was made, which revealed consolidation in the right upper lobe. However, it was not until two days later, or the seventh day of the disease, that definite signs of consolidation appeared in the right axilla and subclavicular region. A few hours later, on that same day, crisis occurred and the child made an uneventful recovery.

Case 2.—A girl, aged one year, a private patient. Onset sudden, high, continued fever, average 104° F. Child did not appear very ill; cough not pronounced. Examination of urine and ear drums repeatedly negative. Physical examination negative until sixth day of disease, when signs of pneumonia over an area size of silver dollar appeared at left subscapular region. Signs never increased in area. Crisis next day and uneventful recovery.

Case 3.—A girl of eight years, seen in consultation on fifth day of disease. Temperature 105° F. In this case dyspnea, cough, anxious facies, and pain in left lower abdomen were pronounced. Physical examination of chest entirely negative. Tentative diagnosis of lobar pneumonia (left lower lobe) was made. Two days later signs of consolidation in this area appeared, followed the next day by crisis and uneventful recovery.

The prognosis of lobar pneumonia in children is vastly better than in adults, due probably to the stronger myocardium. The mortality in adults is usually given as about 15 per cent, while in children less than twelve years old it is 3 per cent or less.

Acute otitis media is another common disease of childhood that is easily overlooked. It may complicate nasopharyngeal inflammation due to any cause however mild. Pain is usually an outstanding feature and the child screams continually. However, children less than three years old can rarely localize their pains, and nothing but examination of the ear drums will reveal the cause of their distress. Since this is such a common disorder, and since it can be relieved so promptly by warm carbolized glycerin drops, routine examination of the ear drums should be practiced in every child with fever unless some other very obvious cause can be found. Sometimes acute otitis media is painless, and intelligent children old enough to localize pain will deny earache when in reality inflammation is present. The following two case records illustrate this point:

Case 1.—A girl, aged four years, a private patient unusually intelligent. First seen suffering with mild influenza; temperature 102° F. Fever continued for seven days. Daily physical examination entirely negative. Repeated urinalyses negative. Child denied repeatedly that she had or had ever had earache, and for that reason aural examination was not made. On the seventh day the right ear drum ruptured, followed by free evacuation of pus, and immediate and permanent disappearance of fever.

Case 2.—A boy, aged six years, seen in consultation on the tenth day after onset of scarlet fever. The temperature had not been normal since onset. Physical examination entirely negative, except for several

moderately enlarged cervical glands. The throat had healed. Examination of ear drums was not made, because the patient strenuously objected to having it done. He also denied earache and had never complained of it during his fever; it was thought the cervical glands constituted sufficient cause for the fever. Two days later both ear drums ruptured, followed by free discharge of pus, and immediate and permanent disappearance of fever.

Of all the more common febrile diseases of childhood, pyelitis is most apt to be overlooked. In the vast majority of cases its course is absolutely silent; that is, there are no localizing signs or symptoms. Pain in the back, or over the urinary bladder, tenesmus and frequency of urination are not often observed. Physical examination is absolutely negative and offers no explanation as to cause of the fever.

While pyelitis usually yields fairly readily to proper treatment, yet if untreated it may persist for a long time, *i.e.*, weeks or months. In children the disease occurs almost exclusively in the female sex. Fever in a little girl lasting longer than ten days, and with no physical signs to account for it, is good presumptive evidence of pyelitis. Positive diagnosis can only be made by examination of the urine. One examination is not conclusively negative as clear specimens are sometimes found. The vast majority of these cases are caused by colon bacillus infection. Where this is true the urine is acid, cloudy, and microscopic examination shows many pus cells and sluggishly motile rod-shaped bacilli. The specimens for microscopic examination should not be centrifuged, and twelve pus cells or more in a high-power field is considered as evidence of pyelitis.

The treatment of pyelitis presents unusual difficulties in children. It consists mainly of forced fluids by mouth. The child should drink at least two quarts of fluid in each twenty-four hours, if quick results are to be obtained, and more if possible. The problem is to induce the child to drink the fluid. A little girl with a temperature of 104° to 105° F. is usually too stupid and toxic to want anything to eat or drink.

In severe cases artificial means of introducing fluids must be used. Hypodermoclysis and intraperitoneal injection of physiological saline solution are efficient, but painful alike to parents and patient, and for that reason are not satisfactory. The nasal drip is the least disagreeable and most efficient method of introducing large amounts of fluid. This consists of a small soft-rubber catheter (No. 8 or 10 French) passed through the nose into the stomach, to which is attached a Murphy drip. These little patients object strenuously to the passage of the catheter and have to be restrained from withdrawing it. This is best accomplished by splinting the elbows with cardboard cylinders which project over the hands so that the child cannot grasp objects. The stomach retains fluid introduced in this manner very well, so that seventy drops per minute, or one pint in two hours, can be taken by a one-year-old baby. Medication and liquid food can also be introduced through the tube. The nasal drip is much easier to use in younger children. It is very difficult in a child over two years old.

As to medication: the alkaline treatment is generally considered better than boric acid and urotropin. I have never had any success with the latter and have discarded its use in these cases. The straight alkali treatment is also preferable to the intermittent use of acid and alkali, *i.e.*, changing from one to the other at four- to five-day intervals. Of the alkalies sodium bicarbonate is as good as any, although the citrates and acetates of sodium and potassium are more palatable. Enough alkali should be administered to render the urine alkaline to litmus.

After the effective institution of the foregoing mentioned treatment, fever rarely lasts more than two or three days.

SUMMARY.

Three common febrile diseases easily overlooked in children are: (*a*) lobar pneumonia, (*b*) acute otitis media, and (*c*) pyelitis.

Lobar pneumonia is characterized by late appearance of physical signs and frequent absence of such characteristic symptoms as dyspnea, cough, and pain in the chest. The

prognosis in lobar pneumonia is much better in children than in adults.

Acute otitis media is so common following infections of the nose and throat, even of mild degree, that routine aural examination should be made in all febrile cases.

Pyelitis is so common in little girls that repeated urinalyses should be made in all cases of fever in this sex which lasts more than two or three days and for which no obvious cause can be found.

FRANCIS BUILDING.

Studies in Intracranial Physiology and Surgery

(The Third Circulation, The Hypophysis, The Gliomas)[1]

BY HARVEY CUSHING, M.D.

REVIEWED BY

J. CHALMERS DA COSTA, M.D., LL.D.

Gross Professor of Surgery in the Jefferson Medical College of Philadelphia

For years it has been my guiding principle to read with thoughtful care every journal, monograph, address, lecture or book which bears as author the name of Harvey Cushing. Invariably have I risen from a perusal of one of his contributions with knowledge increased, surgical resources added to, and faith in the greatness and future of the science of surgery made higher and nobler.

The chief characteristics exhibited by his writings seem to me to be as follows: A charming and luminous literary style—a veritable passion for truth and the use of the most rigid methods for ascertaining truth—broad philosophic grasp of every problem discussed—perfect fearlessness in stating and maintaining a position—painstaking care in investigations—a proper respect for the opinions of others with utter repudiation of the slavish adulation so often given authority—insistence on the enormous value of the laboratory, but the "everlasting NO!" to all who would make the laboratory the sole authority, the only guide, the Supreme Court—an expert knowledge of the history of his subject, in sorting out and citing authorities, and an acquaintance with literature which is "singularly exact and profound." I detect these features in all the writings of Cushing, scientific, literary, and pedagogic, from The KitKat Club to the Life of Osler—from his early investigations as to the use of local anesthesia in herniotomy to his studies upon the Gasserian Ganglion—from his Commencement Addresses to his medical history of the Western Reserve—from his youthful article on Division of the Thoracic Duct to his epoch-making contributions on the pituitary gland and tumors of the brain. The present studies are of the same family by right of birth, and each one bears the well-known family likeness.

The First Lecture is the "Third Circulation and its Channels" and deals with the cerebrospinal fluid. In his preface the author protests against the tendencies of the day which make a man more at home in the laboratory than at the bedside, and "know more about calories and colloids, hydrogen ions and hemoglobin" than about sick people. In his preface he also insists that too much emphasis is often laid on diagnosis and too little in determining what should be done when the diagnosis has been made. He demonstrates that the cerebrospinal fluid is in constant movement through channels that cut across the blood circle, and that these channels envelop an organ which does not contain the usual type of lymphatic apparatus.

[1]The Cameron Prize Lectures, delivered at the University of Edinburgh, October 19, 20, and 22, 1925. Oxford University Press, London and New York, 1926.

A great majority of cases of congenital hydrocephalus are not due to obstruction to the flow of fluid from the ventricles into the subarachnoid space or obstruction in one of the cisternæ or in the mesh-like channels over the cortex. Most cases are due to deficient absorption of the fluid from the meningeal spaces and hence to diminished discharge into the venous sinuses. The means by which the fluid is taken up from the meningeal spaces and carried into the venous sinuses we find in the villi of the arachnoid. Cushing does not mean the obvious Pacchionian bodies, for they are pathologic villi and are in all probability without function. The active villi are very numerous, are microscopic in size, and project into the sinuses. He shows the relation between the third circulation and edema of the brain, and dwells on the valuable ideas put forth by Dr. Weed, one of his own pupils. Weed showed the very rapid changes in the size of the brain following the intravenous injection of hypotonic and hypertonic fluids. When hypotonic solutions are introduced intravenously the current in the perivascular channels is reversed, and then such a drug as salvarsan, to which the choroid plexus is normally impervious, may pass and come intimately into contact with the nerve tissues. The surgeon finds that he can lower intracranial tension with great rapidity by an intravenous injection of a hypertonic solution; in fact, a patient may be brought out of a condition of coma with Cheyne-Stokes respiration and restored to consciousness by it. Cushing believes that the cerebrospinal fluid is produced by active secretion from the choroid plexuses, that its circulation is effected under the pressure of the secretion, and that the fluid is in constant motion. Hydrocephalus can be produced by occlusion of the villi by solid particles (blood corpuscles, etc.); by obstruction resulting from inflammation or tumor at the foramen of Monro, in the aqueduct of Sylvius, in the fourth ventricle or in the narrow incisura tentorii, and more rarely by increase in the amount of fluid secreted. The cerebrospinal fluid also carries away waste products of metabolism and is a substitute for real lymphatics. He shows the rôle of the meningocytes in reparative processes and how rapidly in most cases the dura is repaired after injury and the uselessness of employing foreign tissue to close a gap in the dura. If the arachnoid covering the cortex remains intact the dura will reform without adhesions, but if the piarachnoid and cortex have been damaged dense adhesions will form even though the inner surface of the dura was not damaged. We owe this knowledge to Cushing's former associate, Dr. S. C. Harvey.

The channels for the circulation of cerebrospinal fluid may be blocked by blood which has entered the villi of the arachnoid. The salvation of the situation in many cases is the phagocytic activity of the meningocytes, and the surgeon now realizes that in an infant when red corpuscles have entered into the subarachnoid space, which is common in the newly-born, repeated spinal punctures may save the child from fatal compression. Another important statement is that the meninges contain an apparatus similar to or identical with the reticulo-endothelial apparatus of certain other organs, which apparatus is actively phagocytic in its actions upon exuded blood cells. In a subdural hemorrhage the clot sticks to the dura and begins to organize on the side of the dura, but does not stick to the arachnoid. Dr. Tracy Putnam pointed out that a subdural hematoma acquires a greenish color because of a deposit of bilivirdin from broken-down red cells, and in such cases bile pigment may be found in the cerebrospinal fluid. We note that such pigments do not normally pass the choroid plexus. In subdural hematoma the bilirubin gets into the cerebrospinal fluid by way of the perivascular spaces. The bile pigment is formed by the action of the reticulo-endothelial cells on hemoglobin.

We next find an illuminating discussion on the meningiomas, which arise from the arachnoid villi and which have received such a number of contradictory names. The cellular basis of a meningioma is the

meningocyte, and the endothelial ground cells of a meningioma may be transformed into fibroblasts. The writer concludes that we are not much nearer to curing congenital hydrocephalus surgically than we were thirty years ago, but that we have learned many things of therapeutic value.

The second lecture is on the Pituitary Gland. We find in it a record of the extraordinary advances made in the study of this important and interesting structure, in the development of which Dr. Cushing played a most conspicuous part. He considers the question whether the removal of the entire gland of necessity means death, and says that he knows of only one clinical case in which symptoms resembling those of experimental cachexia hypophysiopriva arose and caused death after extensive glandular removal. The author describes experimental hypopituitarism. He was the first to set forth the view that this condition is the result of secondary insufficiency and that acromegaly is in all probability due to a contrary state. We find an inquiry as to what is the active part of the gland and from where the active agents come. Is there one from the anterior lobe and also one from the posterior lobe? Why does experimental removal of the gland cause so many changes in other ductless glands? What is the effect on body growth if the experiments are made upon puppies? One cause of error on the part of observers has been that they did not know that the stalk of the infundibulum contains pathways of secretion connected with the pars tuberalis resembling those of the pars intermedialis in the posterior lobe.

We learn of the formation and discharge of posterior lobe secretion, of the histogenesis of the pars nervosa, of carbohydrate tolerance in glandular disease; of the relation of diabetes insipidus to the pituitary, of the physiology of the anterior lobe, of observations on metabolism; of the relation of the pituitary to the glands of sex; of the influence of the hypophysis on body growth and of surgical considerations relating to tumors and congenital cysts.

The adenomas present a different surgical problem from the congenital cysts, are the more common lesion, and affect pituitary function primarily rather than secondarily.

In dealing with any of these conditions the surgeon must be certain as to the morbid anatomy as well as to the physiology of the gland. To simply evacuate a cyst does not give permanent relief; the wall must be extirpated, and extirpation is very difficult because of the adjacency of the optic nerves. Cysts must be operated upon from above by an osteoplastic approach. The adenomata are approached by the transsphenoidal route. In the last fifty transsphenoidal operations by Cushing there was only one death, and the operative mortality of the Cushing Clinic within recent years has been 2 per cent. In 70 per cent of the cases operated upon there was great impairment in vision before operation. In the study of pituitary cases the perimeter and the ophthalmoscope are of the first importance.

Lecture 3 is a masterly discussion of Intracranial Tumors based on the enormous personal experience of 1146 proved cases. We find a consideration of neurological surgery, old and new, and of certain technical matters relating to brain tumors, symptomatic, operative and diagnostic.

Cushing maintains with great force that the neurological surgeon must be trained not only in the higher and most refined technique of operation, but also in the diagnosis of such cases (requiring the use of the ophthalmoscope, etc.), and in examining the microscopic appearance of sections of the tumor. The diagnosis must be made personally and is not to be taken second-hand from any one. The neuro-surgeon is striving to become more and more accurate in determining not only the exact situation of the lesion but also the character of the lesion.

It is interesting to know that out of 1146 verified tumors only 24 were tuberculomas and only 13 syphilomas. We would have supposed from the writing of older teachers that the percentage of these granulomatous conditions would have been vastly higher.

The lecture contains a remarkable study of the average survival in months of classified gliomata. The worst forms show a

survival of only eight to twelve months, and the more favorable forms show a survival of from twenty-eight to eighty-six months. These facts are noted on 492 verified gliomas. He further demands a careful study of the tumors following their removal and a thorough identification of their cellular composition. In studying a case in which tumor is suspected we must call in the aid of chemistry and of biophysics.

The lecture also refers to Dr. Keen's well-known successful removal of a large meningeal tumor in 1888, and Cushing says "as models of vivid case reporting I would recommend the reading of Dr. Keen's two accounts of this case."

In arising from the perusal of these three most important lectures there comes to us the conviction that except in certain emergencies, traumatic or septic, the general surgeon is not the person to do cerebral surgery. This highly technical branch requires long and peculiar training, and every large city hospital should have a neurological unit composed of men particularly suited to and specializing in the work, and who have been most carefully and thoroughly trained.

Studies in the Pharmacology of Bismuth Salts.

In the *Journal of Pharmacology and Experimental Therapeutics* for July, 1926, LEONARD states that the soluble bismuth salts, sodium potassium bismuth tartrate, sodium bismuth citrate and sodium bismuth thiosulphate exert a toxic action upon the kidney of the rabbit, producing a necrosis of the tubules.

The maximum tolerated intramuscular dose in the rabbit of the soluble sodium potassium bismuth tartrate is about 100 mgm. per kilo (containing 40 mgm. Bi). Twice this dose kills in from one and one-half to five days.

The maximum tolerated intramuscular dose in the rabbit of the sodium bismuth thiosulphate is about 150 mgm. per kilo (containing 50 mgm. Bi). Twice this dose kills in five to six days.

The sodium bismuth citrate is much less toxic, 300 mgm. per kilo (containing 200 mgm. Bi) intramuscular, is just nephropathic in the rabbit, while doses of 125 mgm. per kilo (85 mgm. Bi) are practically nontoxic.

Tables of the daily urinary excretion of bismuth in the rabbit after intramuscular injection are given. The tartrate displays the greatest initial rate of excretion, followed by a diminishing rate to death in the case of toxic doses, while sublethal but nephropathic doses show a series of such changes of rate and stoppages of excretion of bismuth. The thiosulphate displays a lower initial rate but, in lethal doses, a similar diminishing rate to death. In sublethal dose, variation, but no stoppages of excretion, is shown. The citrate displays a bismuth excretion, lower in rate than the tartrate, variable, but without stoppage of excretion at any time.

All three salts display a lower rate of excretion, and lessened total excretion, the higher the dose given. This agrees with the extent of kidney damage.

Thiosulphate is not a detoxicant for the acute toxicity of bismuth in the rabbit. Its rate of excretion is not as great as that of the soluble tartrate nor the citrate. With sublethal doses in two weeks 12 per cent (11 mgm.) of the bismuth injected as thiosulphate was excreted by the kidney, 26 per cent (27 mgm.) of the bismuth injected as soluble tartrate, and up to 15 per cent (44 mgm.) of the bismuth injected as citrate.

The rate of excretion of sodium bismuth thiosulphate is greater than that of the various insoluble bismuth salts. It is proposed that the so-called detoxicant action of thiosulphates upon heavy metals or at least upon bismuth may be explained as a mobilization or solvation of insoluble depots which are producing a local pathology in the skin or mucous membranes. The metal when thus mobilized is actually rendered more toxic in its acute effects such as kidney toxicity, but human therapeutic doses rarely reach a kidney excretion concentration dangerous to normal kidneys even when thus mobilized.

Editorial

THIOSULPHATE OF SODIUM AS A DIAGNOSTIC AND THERAPEUTIC AGENT.

Many years ago we published in the THERAPEUTIC GAZETTE, and later in the *New York Medical Record,* facts concerning the occurrence of malarial hematuria and hemoglobinuria, and again within the last few years a symposium upon this topic in this journal. It would appear from these three contributions to the subject that those physicians who have the largest experience in malarial districts have throughout these years considered that thiosulphate of sodium was the best remedy to administer in the presence of this dangerous symptom, either when quinine has been given or when it has not been administered. Since the introduction of the newer arsenical preparations this drug has sprung into greater prominence, and the enthusiasm with which it has been received in the treatment of a number of conditions is almost as great as if it had been introduced as an entirely new remedy.

Thus we find in a recent issue of the *Journal of Laboratory and Clinical Medicine* a paper by Myers, Marples, Groehl and Throne from which we quote the opening paragraph: "The continued use of sodium thiosulphate is confirming all of the early desires of those who predicted its efficacy in the treatment of the metallic toxemias. About a year ago it was used successfully on several cases of lead poisoning following the absorption of lead tetraethyl. The use of sodium thiosulphate in many refineries and on workmen employed at lead smelteries has again indicated its value. Reports from these industrial heads show that its efficacy is satisfactory. The continued application of the drug in arsenic intoxication shows it to be the most satisfactory means of combating this disturbance, and as a result the application of syphilis therapy has been greatly extended. It has been shown by us that the simultaneous use of the drug with the arsenical does not affect the therapeutic activity of salvarsan. There are several reports from abroad showing that sodium thiosulphate may be used simultaneously with neosalvarsan without producing any change in the therapeutic activity."

We hope that this very optimistic opinion concerning the wide-spread usefulness of sodium thiosulphate will prove correct.

Incidentally, the use of the words "metallic toxemias" is an innovation since, according to medical dictionaries, "toxemia is blood-poisoning due to the presence in the blood of the poisonous products of any pathogenic microörganism."

There is very little doubt that when arsphenamine or neoarsphenamine is used and untoward symptoms develop, thiosulphate of sodium should always be borne in mind, and this holds true not only in regard to symptoms seeming to affect the entire body, but also as to local lesions, as, for example, when by error some of the arsphenamine has escaped into the perivascular tissue, when the injection of a very small quantity of the thiosulphate into that area seems to be without doubt the best remedy.

Nor is the use of thiosulphate of sodium limited by any means to acute poisoning or the manifestations of undesirable symptoms. On the contrary, the paper which we have quoted, and numerous others, have shown that it is an advantageous remedy where late manifestations of various forms of metallic poisoning occur not only as to arsenic, but as to lead, so that it has come to be a drug not to be forgotten in the treatment of the jaundice, dermatitis and scleroderma which occur from the effects of all arsenicals, whether they have been given medicinally or taken by inadvertence, as, for example, where arsenic has been continually taken through the contamination of various foodstuffs, with arsenic derived from the use of insecticides sprayed on various forms of vegetables, and in the poisoning produced by lead as it is employed in the arts.

The authors to whom we have referred now advance the theory that thiosulphate of sodium is a valuable diagnostic agent, quot-

ing Nyiri to the effect that it can be used for the purpose of studying renal function inefficiency. This author showed that when this drug was introduced into the blood stream 60 to 70 per cent of it is oxidized to sodium sulphate, while the remaining 30 to 40 per cent appears unchanged in the urine, provided the kidneys are normal. If renal impairment exists, the quantities eliminated fall from 1 to 23 per cent. The technique consists in the use of 10 cc. of a 10-per-cent solution given intravenously after the bladder has been emptied, the collection of the urine every hour for three hours, and testing of these samples by iodine titration. Other investigators have employed this method with asserted good results, but the diagnostic use of thiosulphate of sodium apparently does not stop with this test, since the authors of the article which we are quoting report a number of cases in which symptoms were due to intoxication with metallic substances, although it was impossible by the history of the patient, or other means, except the use of thiosulphate, to determine that the symptoms were due to an intoxication. Thus one patient suffered from scleroderma which began in the feeling of tightness of the skin over the knees and then over the ankles, and finally over the trunk, hands, and arms. Thyroid treatment gave no result. An examination of the urine showed a trace of arsenic. It was then decided to treat the patient with sodium thiosulphate by the method of giving 15 grains daily, with the result that as early as the second day the arsenic in the urine increased from a trace to 1.54 mgm. of arsenic to 100 grammes of dried specimen, and at the end of thirty days the excretion of arsenic was 0.60 mgm. During this time the scleroderma continually decreased, and at the end of six months the patient was discharged entirely cured.

Poisoning by arsenic had arisen in this patient by virtue of the fact that the individual had worked as a furrier and absorbed arsenic which had been sprayed upon the furs with which he worked.

In another instance where there was a clinical diagnosis of dermatitis herpetiformis, it was found that the patient had been taking arsenic over a long period of time. He suffered from marked pigmentation of the skin from head to foot and there were keratoses on the hands. In this instance the same dosage of thiosulphate of sodium was resorted to except that it was given intravenously to the extent of 45 injections. It was also administered by the mouth to this patient. The result was that the pigmentation faded gradually and the patient's general state was much improved. In other words, in these cases, this substance exercised three influences: (1) It aided in diagnosis; (2) it induced an increased rapidity of elimination of the poison; and (3) it did much to clear up the symptoms which the poison had induced.

Myers and his colleagues point out that the toxicity of sodium thiosulphate is approximately 6000 mg. per kilogramme of body weight and therefore believe that it is an innocuous substance. Although they state repeatedly in their article, as we have done, that the doses they employed was 1 gramme or 15 grains daily, at the close of their article, after referring to the low toxicity which we have just mentioned, they state that it has been found that 0.5 gramme daily or every other day gives the more satisfactory results.

INTRA-ABDOMINAL PRESSURE.

Recently there has been published a research indicating that the pressure in the abdominal cavity of animal and man is always negative if normal. Aside from the purely scientific interest attached to this investigation it is interesting to note certain points in regard to it. Many years ago the writer of this editorial, with Dr. Martin, showed that producing a positive abdominal pressure resulted in serious changes in the general system. This has some bearing upon intraperitoneal injections, which are now so largely resorted to, in the sense that it indicates that very large amounts of fluid should not be injected into the peritoneum at one time, but in relatively small amounts, so that a positive pressure is not induced at any one time. On the other hand, it was

shown that very much higher intra-abdominal pressure in another sense might be induced without serious results if fluid or air were introduced into the bowel, the wall of which prevented the fluid or air from getting access to the abdominal cavity. A point deserving of emphasis however is that if too great a pressure is exercised upon the wall of the intestine, damage is done to its peritoneal coat, which, of course, is serious.

Exactly why intra-abdominal pressure of high degree should produce deleterious effects, whereas intra-abdominal pressure through the intestine does not so result, is not very clear unless it be that the wall of the gut stands the strain and that the pressure is distributed in a different manner.

The research to which we have referred in regard to the presence of a constant negative pressure in the abdomen has a bearing upon the evil effects of tympanitis during the course of infectious diseases and after surgical operations. Under these circumstances of course intra-abdominal pressure is intestinal and not direct. Still more is this a matter of importance when we consider intra-abdominal pressure arising from a perforation of the stomach and intestine whereby there is established a positive intra-abdominal pressure; in other words, some of the evil symptoms met with in these cases may not be entirely due to septic absorption or peritonitis, but rather to the establishment of a positive pressure.

VACCINE THERAPY.

Although vaccine therapy has now been before the profession for many years, we believe it is a fair statement that instead of increasing in popularity its use is becoming more and more limited. The field in which this method of treatment probably gives the best results is in localized foci of infection and the field in which it gives the worst results are instances in which generalized infection is present. In the first type, by the use of vaccines the whole body may be aroused to the production of protective processes which will attack the invading organism. In the latter type the administration of vaccines only serves to induce a negative phase in which the pathogenic organisms already present find, for a time at least, that the body's methods of combating infection have been diminished.

If one reads many papers upon vaccine therapy, a term which is most unfortunate, for there is no real relationship to cowpox, he will perhaps have a no more clear conception of the limitations of this method of treatment than before he thoroughly studied the question, because opinions are so divergent.

Recently Ledingham, who is Professor of Bacteriology in the University of London and the Chief Bacteriologist to the Lister Institute, has stated that he has just finished an endeavor to disentangle from the raveled accumulation of data on vaccines just those elements which rest on experimental fact. He asserts that in general practice the conditions are far from suitable for procuring reliable comparative statistics with regard to the efficacy of vaccines. He admits, of course, that certain diseases can be prevented or greatly modified by the prophylactic use of these weapons of defense, but he goes on to state that when we consider the many other forms of chronic infection, such as the respiratory and arthritic infections in which vaccine therapy is widely used, we find ourselves to be almost entirely in the realm of pure empiricism, because we have no certain knowledge of the etiology of the infections.

Because infections of the respiratory type are usually due to mixed flora, it has been customary to employ multiple vaccines, and he insists upon the point that all that we can say about vaccines and their use in respiratory infections and in general infections is that they consist in a form of protein therapy; in other words, he gravely doubts whether there is any specificity. Indeed, he goes on to state that only recently the chief advocate of this plan, Sir Almroth Wright, has thrown overboard the specificity of vaccine therapy in the old sense, at least so far as the treatment of acute septicemic infections by vaccines is concerned, and his

method of immunotransfusion is now an attempt to administer passively to the patient the antibodies which the injection of vaccines has produced in another individual who is normal.

Our limited experience with so-called immunotransfusion has not been more favorable than it has been with vaccines, perhaps because this plan has been resorted to too late, not being considered until the disease in the patient was far advanced, or its application delayed while immune bodies could be developed in the blood of a donor.

In certain cases of arthritis it has recently been shown that there is no specificity in vaccines since equal or greater improvement follows the injection of any pathogenic organism that has been killed, or, in other words, one which affords a form of general protein therapy.

How protein therapy produces its good results is still undiscovered, but Ledingham believes that it induces a greater flow of blood through what he calls an indolent inflammatory focus and so brings to the part a greater amount of protective material.

It is to be recalled, however, that when vaccines are used for prophylactic purposes it is of the utmost importance that all thought of protein therapy is cast aside and that adherence of the strictest kind must be made in connection with the germ employed. Thus one cannot make immune an individual who may be exposed to typhoid infection by using any other vaccine but that prepared from typhoid bacilli and its nearly related organisms.

POINTS AS TO THE THERAPY OF SYPHILIS.

As we all know syphilis resembles other acute infections in its early stages, but unfortunately does not run a limited course, which is the explanation of the wide-spread amount of disease of different organs which is constantly met with. On the other hand, it is equally well recognized that after a certain time, whatever damage may be done to the patient's tissues by the infection, he ceases to be capable of carrying out transmission, which is indeed fortunate for the human race. Again, a certain number of syphilographers are firmly convinced that the early administration of specific remedies like arsphenamine prevents the body from developing its own immunizing processes; or, in other words, the full burden of producing an arrest or cure is placed upon the drug and not upon nature's methods. As a matter of fact, the great majority of cases suffering from syphilis are seen after its early stages are well advanced, and possibly it would be correct to state that the majority are seen years after the initial lesion, when, of course, two difficulties arise. The first consists in the fact that the spirochete is deeply buried in inaccessible areas, and the other is represented by the fact that definite pathological changes have taken place which arsphenamine cannot relieve. Indeed it is well known that arsphenamine is definitely contraindicated in some of these late cases, particularly in cardiovascular-renal lesions, and even mercury must be administered with caution, or not at all, in renal cases.

Again, it would appear to be more and more evident that bismuth is a remedy of great value in neurosyphilis; the chief point to be decided at the present time being the best preparation for use under these circumstances.

It is interesting in this connection to note that, in certain parts of the world at least, there is a great increase in the occurrence of syphilis, an increase such as was seen in this country during and after the Civil War, but which apparently was not so notable after the World War, because of a better knowledge of prophylaxis and treatment. On the Continent of Europe, syphilis seems to be at present fairly rampant, and Milian in *Paris Médicale* of March 6, 1926, asserts that there has been no reduction in the number of new cases of syphilis notwithstanding our modern knowledge, that he encounters as many cases nowadays as in 1919; but he attributes this to the presence of the large number of foreigners which invade France from the African colonies, where he states

that nearly every one is syphilitic. He points out that part of the prevalence of syphilis is due to the chaotic condition of its therapy, both in the number of drugs which are employed, the methods of their administration, the tests which are used, and the time during which the treatment is continued. In other words, the introduction of the newer methods has in his opinion induced a condition of confidence in the professional mind as to the efficiency of treatment without sufficient emphasis being laid upon the fact that even with modern methods the disease is a most serious one, cannot be easily cured, particularly if the treatment is mild, and last of all because medical men are too much inclined to consider that because the serum tests are negative the patient is cured. As a matter of fact, he often is not cured of the infection, and he certainly is not to be considered as cured of the results of his infection because serological tests are negative.

Many months ago silver-arsphenamine seemed to possess much promise, but we judge from the small number of contributions made to current medical literature at the present time in regard to this preparation that it has not been found as efficient as the other arsenicals. There can be little doubt, however, that sulpharsphenamine may be used with advantage and that it is a useful substitute in the so-called Swift-Ellis method when arsphenamine is contraindicated. Indeed it is thought by some that it is better in cerebrospinal syphilis than arsphenamine itself.

While under ordinary circumstances bismuth is properly considered quite an innocuous remedy, it is not to be forgotten that however valuable it is in the treatment of this disease, it is capable of producing disagreeable effects. Its chief field of usefulness is in those cases which have an idiosyncrasy to the arsenicals. The fact that it is given through the skin and never in a vein and that its administration is practically painless is another factor in its favor, and, as already pointed out above, in many cases of cerebrospinal involvement, it seems to do better than arsenic.

In the *Dermatologische Wochenschrift* of April 18, 1926, Buetl writes concerning "stovarsol." Evidently he does not think much of its efficiency, because six days after a full dose was given spirochetes could still be found in the sore and no change for the better had appeared in the lesion. The injection of bismuth, however, at once removed the spirochetes and resulted in the prompt healing of the sore. In another instance after twenty-two days, during which several doses of stovarsol were given, no improvement was noted, but a rapid change for the better took place when bismuth was used. Furthermore, it did not seem to have much effect on the Wassermann reaction after four months of treatment. In some cases, however, when secondary syphilis was well advanced, a negative Wassermann was obtained at the end of sixty or ninety days, but the test became positive when treatment was stopped.

It is only fair to state that there were no disagreeable after-effects of its administration, and Buetl believes that this drug can be used when arsphenamine is contraindicated for the purpose of treatment, but evidently it does not rank with the older drugs.

CONTROL OF HEMORRHAGE BY SODIUM CITRATE.

Sodium citrate has long been used and in weak solutions as an anticoagulant. This property is well recognized. It is not so widely known that in concentrated solution intravenously it exhibits at times an almost magical effect in controlling hemorrhage. This effect would seem to be one which might least be expected since the citrate is constantly used in transfusion as a means of preventing clot. None the less clinical evidence as to the efficiency of strong solutions injected intravenously is as conclusive as such evidence can ever be, based as it is on many observations made by many different men.

Natasi credits Neuhof and Hirschfeld with the popularization of the use of sodium

citrate as a hemostatic. The dose is 30 cc. of a 3-per-cent solution injected slowly into a vein, preferably at the elbow. Nastasi has found the treatment serviceable in cases of hemorrhage from the bowels, nor has he observed any ill effects from these injections, except perhaps some tingling and a metallic taste in the mouth.

Renaud *(La Tribune Médicale,* No. 7, 1926) holds that these injections in strong solution will stop any hemorrhage whatever be its source or cause; the citrate lessens the viscosity of the blood and increases its coagulability. Maurice Renaud and Juge found the treatment particularly efficacious in dealing with bleeding cancers. The hemorrhage which did not yield to serums or organic extracts stopped promptly. They hold that this treatment is more efficacious in obtaining such result than any or all others yet attempted. They report on some hundreds of cases. They apply this method as a means not only of lessening the bleeding at the time of operation but as a satisfactory method of holding in check the loss of blood from ulcers of the mucosa. Also, they recommend these injections for the control of excessive bleeding at childbirth, and the loss of blood which is incident to uterine fibromas, and as a means of controlling excessive flow in the menstrual period. The reaction of congested and bleeding mucosa, as, for instance, in persistent nosebleed, and in that type of bleeding from the stomach unattended by ulcer, seems particularly prompt and satisfactory. At times a rather large injection may be followed by a form of shock characterized by pallor, pain in the chest, a running pulse, headache, and fever.

It is held that strong citrate has a physico-chemical action on the plasma and a direct one on the nerve filaments supplying the capillaries. Injections of 2-per-cent solution have been recommended by Meyer and Steel in the treatment of obliterating thromboarteritis, these injections being repeated every day for a month. Such treatment has been reported as having cured intermittent claudication and gangrene of the toes.

Physiologists and clinicians have long recognized the value of citrate of soda as stimulant to biliary secretion, it being held that the liver action of this drug is possibly due to the rapid modification of blood viscosity, thus allowing of freer circulation in the capillaries.

ANESTHESIA.

There are many ways by which surgical procedures may be rendered painless, and the primal purpose of the anesthetic is to insure this end. It may be insured by a blow upon the head which if so regulated as to produce a moderate degree of concussion might be attended by no evil consequences of note. Indeed this method of anesthesia has been practiced when other methods were not available. It is usually secured by the administration of drugs, usually by inhalation, sometimes by oral ingestion, rectal introduction, or hypodermic injection. In the latter case, and when what are called the local anesthetics are used, operation can be rendered painless without loss of consciousness, and this means all major operations may be performed without causing other than very little discomfort to the patient and often not even that.

Among the anesthetics given by inhalation ethylene is becoming increasingly popular. Sise *(Surgical Clinics of North America,* Volume VI, No. 3) states that for the last year and a half more than half his cases have been done in whole or in part under this anesthetic, nitrous oxide being relegated to the background. His reasons for this change are that more oxygen can be used with ethylene than is the case with the nitrous oxide, and hence there is a wider margin of anesthesia before asphyxia is reached, therefore a larger margin of safety. There is less anoxemia, there is a quieter respiration, there is more relaxation, though not as great as is obtainable with ether. The main objection to ethylene is based on the fact that it is highly inflammable and when mixed with air or oxygen highly explosive.

Some accidents have been reported; doubtless many have occurred which have not been thought worthy of publication. These explosions have not always been due to carelessness—*i.e.*, the presence of an igniting agent in or about the operative field or the patient's head. They have often been caused by the electric spark. At times this spark has been caused, not by short-circuiting or careless wiring, but by static. Such accidents have naturally occurred usually in cold weather, and their assured prevention implies somewhat elaborate precautions. These have been abundantly set forth by Sise *(Boston Medical and Surgical Journal,* Feb. 12, 1925).

The recovery from ethylene is prompt, and the after-effects of the inhalation are as transitory as are those following nitrous oxide.

There still remain many surgeons who use only ether and some who still adhere to chloroform as their sole means of producing anesthesia. A convincing demonstration of the cellular changes incident to the use of these drugs, and this applies particularly to chloroform, seems to indicate that these adherents to the older method will become fewer with the passing years. It still remains true, though chloroform because of its cellular toxicity will probably be abandoned completely, that ether may be largely used, but as supplementary to other agents and for the purpose of producing that relaxation not obtained by them.

The method which perhaps is most popular with the progressive surgeon of to-day is what Lundy calls "balanced anesthesia," to wit, where this seems indicated, the administration of a preliminary hypnotic, the employment of a local anesthetic, at the time of operation ethylene and nitrous oxide up to the point of unconsciousness with the preservation of normal color, and, if the need arise, the addition of ether. Supplementary to this Lundy speaks with favor of 5-per-cent carbon dioxide which when properly used is an active stimulant to respiration and allows larger doses of morphine to be given with safety.

In dealing with this form of "balanced anesthesia" Lundy *(Minnesota Medicine,* No. 7, 1926) advises the anesthetist to keep the patient asleep and the color natural. In the line of safety he should keep the patient's color as pink as possible whether he keeps him asleep or not.

Among those who head the progressive group of surgeons local and regional anesthesia are rapidly displacing all other forms. The solution of choice is novocaine given in one-half- to one-per-cent solution and in quantity up to 50 or 100 or even 200 cc. Epinephrin is often added to this solution since it seems to prolong the anesthesia and to lessen the danger of toxic absorption. Five minims of a 1:1000 epinephrin solution are added to 100 cc. of the novocaine solution. The prediction of the future of surgical anesthesia is that it shall be in the main local and regional; that individual cases may require preliminary hypnosis and supplementary inhalations.

Nitrous oxide and ethylene, safe in the hands of the experienced, are far more dangerous than ether when given by the inapt. Local and regional anesthesia given by the inapt and in doses recognized as safe will have no effect more harmful than a failure to accomplish the abolition of pain. This failure is practically always due to lack of skill in giving the injections. The local and regional anesthetist must be even more carefully trained in neural anatomy than is the general surgeon, and must acquire by clinical experience, and a long one if he is to attain satisfactory skill, the method of surely obtaining the desired result.

Progress in Therapeutics

Medical Therapeutics

Heredity and Sterilization.

In the *Ohio State Medical Journal* for July, RHODES asserts that heredity is a fact and a reality as far as mental disorders are concerned, and he offers his views on the legal sterilization of psychotic patients confined in our various State hospitals.

He firmly believes that if the sterilization procedure was permitted by law, we could do pronounced good to society in general, and to future generations and the government. We could prevent the birth of a vast number of future insane and mental defectives who otherwise would become charges upon the government and society, and who, if not rendered sterile by legal procedure, would become progenitors of still future generations of insane and mental defectives. The sterilization procedure is always accepted as logical and desirable by all members of the public after its purpose has been explained to them.

Unfortunately many of the lay public who are ignorant of its purpose have a horror of such a procedure. The reason of this is due to the fact that they are under the false impression that to sterilize a male or female means to deprive them of their natural sexual instinct, love, and sexual soul. This of course, as we all know, is an erroneous idea. The sterilized patient is neither changed in mind, soul, appearance, or sexual impulses. There are no secretory organs removed whatever. There are no sex glands removed. The gonads are left intact in both sexes.

The operation for sterilization in the female consists of the removal of a whole or part of the oviducts. He prefers Crossen's operation in which the inner fourth of each oviduct is resected. Either operation, of course, prevents the ovum from entering the uterus, and also prevents the spermatozoa from coming in contact with the ovum. It is impossible therefore for the ovum to become fertilized, and in turn impossible for pregnancy to occur. The operation is practically without danger to life, and is performed in a period of about thirty minutes.

The operation for sterilization in the male is considerably easier, and performed in less time, and always under a local anesthetic, novocaine being used. No abdominal incision is necessary. Resection of about an inch of the vas deferens on either side is done, an incision being made over each vas and directly anterior to the pubic bone. The operation is simple, and the patient is not incapacitated longer than a day or so. This operative procedure, as in the female, does not deprive the patient of any sexual instinct whatever. It merely prevents his ability to produce offspring.

From January 1, 1924, to January 1, 1925, there was admitted to the Massillon State Hospital 673 patients, 255 of which were women. These 255 women had 350 living children. If these 255 women had 350 living children, the 418 men admitted would have, by proportion, 690 children, a total of over 1000 living children born of mentally defective progenitors, who entered the hospital in one year. These 1000 children unfortunately cannot be designated as pedigreed offsprings. Figure the proportionate increase by year from these figures, and you can see one of the reasons why it is necessary to build housing room constantly at our State hospitals. Additional room for incoming patients is always in demand. The crowded condition of each of the various hospitals is deplorable. We must have more buildings in which to house them. But think of the future, say fifty or a hundred years hence, if this custodial building programme goes on. A little thought will convince each of us that the field of psychiatry must get up side by side with the constant progress of other branches of medical science. We

are much in the rear. Too much routine and custodial methods instead of scientific effort and research should not be. The sterilization procedure, if legalized, will help us to prevent insantity. This would give us the opportunity of progressing in preventive medicine, as regards psychiatry. A modern medical and surgical building, or what we might term a hospital, with a research department well equipped and directed by physicians devoting full time to such work, would be a means whereby we could solve the mysteries of insanity, especially the etiology, pathology, etc., about which we know nothing with regards to many types. With such facilities we may hope to cure those types of psychoses which are now recognized as incurable. In this present day the staffs of the Ohio State Hospitals are sadly depleted. They cannot institute scientific medicine properly, nor have they the facilities to do so. Research is an impossibility under present conditions.

The sterilization procedure, if legalized by a State law, would give us the opportunity to institute measures for the prevention of many types of mental disorders. Such a proposed law, however, must provide for practicability in enforcement, and the formality in selecting patients must not be complicated, or else it would never be carried out. It must be easily workable. The cases for sterilization should most certainly be selected by the entire hospital staff of physicians, and one outside physician, whose specialty is of minor importance. Rhodes tells us that since 1922, nine States have passed a sterilization law.

Lime Burns of the Eye.

In an editorial on this subject, the *Lancet* of June 19, 1926, states that among industrial accidents to the eye, lime burns of the cornea due as a rule to mortar or cement hold an important place, the resulting opacity being due not only to the actual destruction of corneal tissue but to the deposition or particles of insoluble calcium carbonate. A method of treatment founded upon the knowledge of this fact was recommended by zur Nedden at the Heidelberg Ophthalmological Congress in 1905, but although mentioned in Fuch's Römer's and Parson's textbooks it does not appear to be generally known

Wolff, in the April number of the *British Journal of Ophthalmology*, in stating these facts gives details of two cases successfully treated, and tells us that the method is now in routine use both at University College Hospital and at Moorfields. The method consists of daily irrigation for a period of fifteen minutes with a solution of 10-percent neutral ammonium tartrate. By this means the insoluble calcium carbonate is converted into the slightly more soluble calcium tartrate, which is slowly washed away. In recent cases it is necessary thoroughly to cocainize the eye as a preliminary to treatment. In an acute case of this sort, in which vision was at first reduced to counting fingers, it was restored to normal after six weeks' treatment. In another patient who had already been treated for a month elsewhere the vision was improved from 6/60 to 6/12 after two months of the ammonium tartrate treatment. These successes should be noted by medical officers who work in industrial districts.

Ethylene: The New General Anesthetic.

In the *Virginia Medical Monthly* for July, 1926, CHIPMAN reports that during the past fifteen months he has used ethylene in 1124 cases. In fact, since he started using ethylene he has not used nitrous-oxide-oxygen in one major operation. The 1124 cases included various minor operations and such major operations as appendectomies, herniotomies, gastroenterostomy, Cæsarean section, radical amputation of the breast, thyroidectomy, reduction of fractures, bone work, removal of gall-bladder, all kinds of vaginal work, obstetrical cases, etc.

All adult cases have had morphine sulphate gr. ¼ and atropine sulphate gr. 1/150 before being brought to the operating room.

Morphine not only relieves the patient before coming to the operating room, but it also is a powerful aid in producing a more perfect relaxation in all cases, especially the more resistant ones. With morphine, less ethylene is used, but more oxygen is required. There are a few anesthetists who object to morphine before any form of anesthesia. It adds so much to the comfort of the patient before and after operation, and aids in producing so much better relaxation, that he indorses it in the strongest terms. He asserts that we too frequently forget the comfort of the patient in the rush of our daily work.

If ethylene is to become a safe and practical general anesthetic, it must have some very definite advantages over ether and nitrous-oxide-oxygen, the two general anesthetics now in daily use. These advantages are:

(*a*) Patients are quickly anesthetized and recovery is rapid.

(*b*) Reduced postoperative nausea and vomiting.

(*c*) Absence of cyanosis.

(*d*) Relaxation.

(*e*) Period of analgesia and anesthesia.

(*f*) Absence of sweating.

(*g*) Absence of headaches.

(*h*) Lack of gas pains.

Patients are quickly and easily anesthetized without any struggle and without any discomfort or any sensation of suffocation. It is not uncommon, after the ethylene and oxygen is started, that there is not a single movement of hand or foot until the anesthetic is stopped.

There seems to be no excitement experienced during induction or afterward, as we have with both ether and nitrous-oxide-oxygen. On the contrary, the patient is very much composed, and will frequently sleep more or less if not disturbed.

Because of the ease of induction with ethylene, he has discontinued the use of nitrous oxide as a preliminary to ether anesthesia. With ethylene-ether sequence, the patient is anesthetized more easily and more quickly than with nitrous-oxide-ether sequence. The patients recover from the anesthesia usually within one to three minutes. The mind is clear, the color is normal, and the patient does not look as if he has just undergone a major operation. There is lack of excitement that is common after ether or nitrous oxide.

As to post-anesthetic vomiting, Chipman well says that it is always hard after any major operation. To say that the anesthetic is the sole cause for vomiting is misleading. The operation, morphine used before and after, doing without food—one or all of these combined with the anesthetic may cause nausea and vomiting. Under the same conditions, one patient may have nausea and vomiting, while the next will be entirely free from it. Nausea and vomiting occur in about 75 per cent of the patients who have ether anesthesia. [We believe this is an excessive estimate.—ED.]

With ethylene anesthesia, vomiting occurs in only about 25 per cent of the patients after they return to their room. Nearly all patients having ethylene any length of time will empty the contents of the stomach within the first minute or two after the anesthetic is stopped. From the amount of gastric juice, bile, and undigested food that is frequently emptied out on the operating table, this vomiting would seem to be beneficial rather than otherwise.

As most patients fully react from ethylene in one to three minutes after the anesthetic is stopped, the vomiting usually occurs before the patient is fully awake, and frequently does not know that he has vomited.

The vomiting after ethylene anesthesia is usually projectile in character, coming on after fluids have accumulated in the stomach, and there is not that violent retching and nausea which prevails after ether anesthesia. The patients who, on being returned to their room, are left absolutely quiet, are not permitted to talk, and are not given water by mouth for some hours, are much less apt to vomit. It is hard to make the friends of the patient, and even the nurses, realize that, although the patient following a major operation may be fully reacted, he is in no

condition to talk. No one should be permitted in the room except the nurse, and the room should be well ventilated. The atropine used in the premedication may be the cause of some of the thirst, so in the future he is going to use only morphine sulphate.

All patients on being returned to their rooms should have water or normal salt solution per rectum, which will reduce this thirst and largely do away with the need of giving water by mouth for several hours.

The Treatment of Children Suffering from Acute Cardiac Affections.

In *The Practitioner* for July, 1926, THORNE states that in cases of dilated hearts in children, the sequelæ of myocarditis, endocarditis, or pericarditis, resulting from rheumatic or other infection, a course of "Nauheim" baths will restore the patient to health much more rapidly, certainly, and surely than any other form of treatment.

The Treatment of African Sleeping Sickness with Tryparsamide Administered Intramuscularly.

In the *American Journal of the Medical Sciences* for July, 1926, KING states that tryparsamide is well tolerated in 20-per-cent solution given intramuscularly, but in 30-per-cent solution causes more discomfort and leads sometimes to abscess formation.

It has a definite trypanocidal action in the blood, the lymph, and the cerebrospinal fluid.

With the exception of a certain type of previously chronic case, tryparsamide, given by the intramuscular route, is a specific in African sleeping sickness incited by Trypanosoma gambiense.

Tryparsamide is equally efficacious in all stages of the disease, except in certain cases previously treated with arsenical and antimony preparations in which its efficiency is limited.

There is a definite correlation between clinical symptoms, number of cells in cerebrospinal fluid, and weekly treatments of tryparsamide, which may be expressed as follows: The number of cells in the cerebrospinal fluid varies inversely and the clinical symptoms improve directly with the number of weekly injections.

The Prevention and Control of Parathyroid Tetany by Calcium Lactate.

In the *American Journal of Physiology* for July, 1926, DRAGSTEDT and SUDAN in their "Studies on the Pathogenesis of Tetany" state that adult dogs may be kept alive and in good condition after a complete thyroparathyroidectomy by the oral administration of calcium lactate. It required from 1.8 to 4.4 grammes of calcium lactate per kilo of body weight per day to keep these animals free from tetany. After from five to eleven weeks these animals remained in good condition and free from tetany without receiving any calcium medication. The work of Luckhardt and Goldberg (1923) is confirmed.

In a young dog, six weeks old, it required from 6 to 12 grammes of calcium lactate per kilo of body weight per day, given by mouth, to preserve its life following a complete thyroparathyroidectomy and to control the postoperative tetany.

Pregnant dogs may likewise be kept alive and free from tetany following thyroparathyroidectomy by the oral administration of calcium lactate. During the latter part of pregnancy and immediately preceding delivery it requires far more calcium to prevent tetany than at earlier periods.

Milk in amount of from 500 cc. to 1500 cc. daily did not prevent the appearance of parathyroid tetany in adult dogs nor preserve the life of these animals after thyroparathyroidectomy. It was even less effective in a young dog. Milk given in amounts of from 1500 cc. to 2900 cc. daily did not control the tetany of pregnancy or lactation.

The suggestion is made that the well-known ameliorating effect of a diet of cow's milk in parathyroid tetany is more probably due to its content of lactose than to its content of calcium. It is also suggested that the superiority of human milk over cow's

milk in preventing infantile tetany is due to its greater amount of lactose and in part due to its decreased amount of phosphate rather than to its calcium content.

The Effects of Caffeine and Theobromine upon the Formation and Excretion of Uric Acid.

In the *American Journal of Physiology* for July, 1926, CLARK and DELORIMIER state that the ingestion of either caffeine or theobromine tends to increase the concentration of uric acid in the blood.

After caffeine ingestion there is evidence of an increase in uric acid production. After theobromine ingestion its formation seems to be unchanged, but its rate of excretion diminished. It seems probable that the increases in uric acid are not due to direct oxidation of these methylated xanthines.

Prolonged administration of either caffeine of theobromine seems to depress active excretion on the part of the kidney.

There exists no proportional relationship between the amount of drug given and the quantity of uric acid excreted.

Under normal conditions there exists a relationship between the volume of urine and the quantity of uric acid excreted, but under diuretic conditions (other than that produced by uric acid itself) no such relationship is evident.

Cholagogic Properties of Magnesium Sulphate.

In the *Boston Medical and Surgical Journal* of July 8, 1926, MENDENHALL, MCCLURE and CATE state that clinically and experimentally, several explanations have been offered to interpret the action of magnesium sulphate. First, that it increases bile flow because of osmotic effects exerted in the upper duodenum and surrounding tissue, thereby relieving swelling and congestion and thus affording ready egress of bile from the common duct. Second, that it increases bile flow because of an effect upon the sphincter of the common duct, relaxing it and providing for a facilitation in bile expulsion; or by reflex effects upon the gall-bladder causing contractions which expel the bile. Third, that it stimulates liver cells to greater production of bile. Fourth, that it increases bile flow by a combination of the first three mechanisms.

Obviously, in the first two explanations, bile production *per se* is not affected, but are instances of increased mechanical activity for bile delivery to the intestine. Mechanical obstruction to bile flow is a very common disturbance encountered clinically, and if it is not severe may be overcome by just such a change in mechanics as magnesium sulphate may bring about on the basis of each or both of the first two explanations. However, the experimental work on which either of the first two theories mentioned is based is inadequate to prove their correctness.

A bile flow that is deficient qualitatively, quantitatively, or both, may present the possibility of abnormal liver function, in which case the object of treatment may not be met by magnesium sulphate if its only actions are those resulting in changed mechanical conditions. Qualitative changes in the bile have been demonstrated in patients whose livers were presumably functionally deranged in observations made in the Evans Memorial. The clinical observations seem sufficiently numerous to warrant the conclusion that magnesium sulphate has a direct stimulating effect upon bile secretion, but its experimental demonstration has hitherto failed to verify the clinical observations, and some are inclined to believe that the results observed clinically may have been fortuitous. Most of the animal experimenters in reporting their results say that magnesium sulphate does not affect bile secretion, or if it does, affects it in the way of depression rather than stimulation.

The results obtained in this investigation confirm many of the clinical observations. While it was generallly noted that small doses of magnesium sulphate increase bile flow, it was also noted that large doses decrease the flow. Clinically, a decreased flow has been noted which, in the light of their

investigation, may be explained by a too rapid absorption and a consequent depression of bile flow. It is conceivable that this may occur when the concentration employed is too high for the particular mucous membrane involved. Thus a 33-per-cent solution is a relatively high concentration and as such the salt action which results may so injure the mucous membrane that it behaves like a passive membrane and permits a more rapid penetration of the salt and a consequent sudden appearance of relatively large amounts in the circulation. Then it depresses bile secretion just as effectively as it does when *injected intravenously* in large amounts. A practical illustration of this was noted during their investigation. A patient was under treatment by magnesium sulphate, 33-per-cent solution by duodenum, with no increase in bile flow. Upon using a more dilute solution there resulted copious outflow of bile. From the results of this investigation it would seem that such high concentrations as 33 per cent are not necessary, in fact may sometimes be harmful.

The evidence herein reported shows that biliary flow occurs when proper amounts of magnesium sulphate reach the liver by way of the blood stream, directly after absorption from the gut. Comparable results are obtained whether the gall-bladder is *in situ* or has been excised. These results show conclusively that magnesium sulphate stimulates the actual production of bile by the liver cells—*i.e.*, has a true cholagogic action. They also show that the quantity of bile which can reach the intestine is not necessarily influenced by the presence or absence of the gall-bladder. The results of these observations on animals support the contention of McClure, and his coworkers, that in man bile found in duodenal contents has come for the most part directly from the liver and has been modified slightly, if at all, by an action of the gall-bladder. That magnesium sulphate is absorbed from the intestine is indicated in the cases where death occurred following introduction of a large dose into the intestine. These large doses may also cause depression of bile flow, as is plainly indicated in the results of Fraser.

The results of the investigations of Mendenhall and his colleagues substantiate in their opinion many of the clinical observations and seem to warrant the following conclusions:

Introduction of magnesium sulphate into the portal circulation as described increases the bile flow in the absence of the gall-bladder, and therefore its obvious result is a stimulation of bile production by the liver cells.

Large doses of magnesium sulphate intravenously (*i.e.*, amounts greater than is possible of entering the circulation under ordinary conditions of absorption) cause a retardation of biliary secretion.

Large doses of magnesium sulphate by duodenum may cause depression of bile flow, which in the light of their studies is due to rapid absorption of magnesium sulphate.

When magnesium sulphate is introduced directly into the intestine it has a cholagogic effect exclusively of any that may conceivably be exerted through local or reflex mechanisms.

The cholagogic action of magnesium sulphate is more marked in instances where bile flow is diminishing or is small in amount.

The evidence supports the usual conception that magnesium sulphate is absorbed from the intestine.

Ephedrin Therapy in Addison's Disease.

In *Endocrinology* for May-June, 1926, ROWNTREE and BROWN state that ephedrin is relatively non-toxic and may be used orally, subcutaneously, or intramuscularly without undue toxic effects, in amounts sufficient to increase blood-pressure and to raise the rate of metabolism.

While increase in blood-pressure and in rate of metabolism may be demonstrated in Addison's disease as the result of ephedrin, these changes are rarely accompanied by significant subjective or objective evidences of clinical improvement. So that in their

experience ephedrin is not an effective specific remedy in the treatment of Addison's disease. The results obtained with ephedrin have been disappointing.

Because of its low toxicity and its effect on blood-pressure and on metabolism when administered orally, its further trial in other hypotensive and hyposthenic states is warranted.

They say that it must not be concluded from the results they recorded that ephedrin will not prove useful in other fields.

The Conservative Treatment of Septic Abortion.

SHALLENBERGER, in the *Piedmont Hospital Bulletin* for May and June, 1926, well says that the indiscriminate curetting of all cases of abortion is not only unnecessary but unsafe. Curettage is a much abused procedure. Conservative treatment, and especially in infected cases, will give far better results. In carrying out the conservative policy the perineum should be shaved and pituitary extract should be given hypodermically in small doses at two- to four-hour intervals for several days, as may be indicated by the progress of the case. Ergot by mouth may also be given if there is a tendency to bleeding. The pituitary extract and also the ergot serve to favor expulsion of the uterine contents, they lessen the loss of blood, and, he believes, they tend to limit the spread of the infection by keeping the uterus in a state of contraction. The Fowler position should be used if the patients are not too ill. He does not advise vaginal packing where infection is present. Fresh air and forcing of food and fluid are important. Opiates and sedatives are to be given as indicated for relief of pain and restlessness, etc.

It is surprising how rapidly the temperature will often drop and how frequently and completely the uterus will empty itself under this conservative management. The old idea that "blood poisoning" will result if placental tissue should be left in the uterus is disproved. There is a deeply rooted belief among the laity that failure to immediately empty the uterus by active interference, when an abortion has been incomplete, borders on criminal neglect. The presence of chills and fever seems to make active treatment all the more urgent. This idea will have to be met and overcome. An infected abortion is a condition that calls for "masterful inactivity." Not only will the medical profession have to come to a realization that the conservative policy is best, but they will have to educate the laity to an understanding that greater safety lies in keeping out of the uterus in the presence of infection and that mortality and morbidity will both be higher where active interference is carried out than where a conservative method of treatment is adopted.

[This very important advice is to be well remembered.—ED.]

Toxic Adenomas.

In *Endocrinology* for March-April, 1926, just received, HERTZLER says it must always be remembered that a true "Basedow" may be implanted on an old colloid goitre. The clinical findings and the history should enable one to determine with a considerable degree of accuracy which are the combined cases. The histology shows such combinations clearly. This becomes more obvious when the course of the disease after operation is compared with the slide from time to time, for neither our interpretation of the slide nor our judgment of the clinical conditions is infallible.

The important fact in this connection is that the whole gland of the toxic adenoma is diseased. The histology indicates that it is injured beyond repair. According to present methods we remove a part of the diseased tissue. This is unsurgical. The demands of ideal surgery dictate that the whole of the diseased tissue shall be removed. The question is, are we able at this time to meet the ideals in the surgical treatment? The result is a myxedema. This myxedema can be controlled by the use of thyroid extract. There are no more

comfortable persons than those myxedemics who take their grain a day. Hertzler asserts this is better than to allow the patient to depend on the remaining part of a hopelessly crippled gland. He believes the facts will substantiate this statement. We need more detailed knowledge, both in pathology and clinical diagnosis, before we can speak with assurance. Besides, the technical difficulties in removing all the gland are by no means small. Something more exact than the grab and cut method commonly employed in thyroidectomy must be adopted. The recurrent nerves and the parathyroids must be spared.

Much work must yet be done in which the whole gland is deliberately removed. The production of myxedema is still considered an actionable offense, and no one cares to publish evidence for the use of the attorneys for the plaintiff. The law requires the surgeon to exercise the skill common to the profession in his environment. To do better than the average is as great an offense as to do worse. [Legally. —Ed.]

The X-Ray Treatment of Hyperthyroidism.

In the *New Zealand Medical Journal* for June, 1926, McDougall states that all the patients in his series have had the usual symptoms of hyperthyroidism, varying in degree from mild to severe, and are classified according to the three clinical types known as: (1) Exophthalmic goitre, (2) hyperplastic toxic goitre, (3) toxic adenoma. He is in agreement with those radiologists who advise against *x*-ray treatment in colloid, cystic, and simple goitres with no toxic manifestations.

The best response to treatment was noted in the exophthalmic group, and the least in the cases of toxic adenoma, while the hyperplastic type occupied an intermediate position. This finding is at variance with some writers, who report exophthalmic goitre as last in the order of response to therapy. The reason advanced is that it may be due to the fact that exophthalmic goitre usually comes after the symptoms have become more pronounced, and after cardiac degeneration has occurred, or even after mental symptoms have begun to show.

Other authorities on the other hand, and they appear to be the more numerous, give the order of the response in the same classification as his own.

Analysis of the 54 cases: 38 recoveries, 9 discontinued treatment, 6 improved (1 postoperative, died of insanity, 2 postoperative, 3 operated subsequent to *x*-ray treatment), 1 wrong diagnosis—a cyst. One of the recoveries had been operated on five years previous to *x*-ray therapy and had relapsed.

Taking all the cases treated he says the percentage of recoveries was 70, whereas if nine cases which discontinued treatment, including the case of wrong diagnosis, and two others, one of which was operated on early in the course of treatment, and one which was to continue treatment, be excluded, then the percentage of recoveries was 85.

In attempting to compile statistics he frankly confesses that he labors under the same difficulties as all those writers so engaged, owing to the much appreciated problem of following up one's cases. He has made it a practice wherever possible to keep the patients under observation for many months after treatment, and in some of the eariler cases this has extended over a period of ten years.

For the most part the treatment has extended over a period of five to six months, giving small doses three times weekly on alternate days. After three or four months the applications are made less frequently, gradually tapering off toward the end of the course. In a few days where the patient has to come a distance from the country, fortnightly and three weeks intervals have been adopted.

The *x*-ray technique is as follows: Spark gap, 8 in.; distance of anticathode from skin, 20 centimeters; filter, 3 millimeters aluminum; 2.5 milliampers, Coolidge tube; five minutes over each area, both lobes and thymus. Only one of the three areas re-

ceives an application each day the patient comes for treatment, except in the case of the country patients already mentioned, when a dose is given to each area on the one day.

McDougall states that many American radiologists prefer a technique similar to Pfahler's. He employs the following, with a transformer or closed type of coil as the source of electrical energy: Spark gap, 9 in.; distance, 8 in.; filter, 3 mm. aluminum and 1 mm. sole leather; 5 milliamperes; 5 minutes over each area, applied every three to four weeks, both lobes and thymus.

The advantages associated with small doses at frequent intervals are many—the patient more quickly gains confidence in the treatment and has less time in which to worry over his symptoms in the intervals between the applications; all skin reaction is avoided; a better control of the hypersecretion by exercising a practically continuous action upon the secretory function of the thyroid gland. Large doses apparently have no more effect than small doses applied at short intervals—massive doses are contraindicated owing to the likelihood of causing a dermatitis and later telangiectasis. His impression is that this latter method of application is a faulty technique which is responsible for inducing an intense fibrosis which may later give the surgeon some trouble should an operation be deemed necessary following a failure or a relapse.

McDougall has noted that *x*-radiation has an inhibitory effect on the cells of the glandular structures. Atrophy of the cells follows, and these disappear and are replaced by connective tissue. Subsequently contraction of this new fibrous tissue may so interfere with the blood supply as to cause further inhibition of glandular function.

Within three or four weeks an improvement is observed in the nervous symptoms. A feeling of well-being is experienced by the patient—this is no doubt largely due to the tonic action of the radiations. Usually at the end of the second month there is a definite drop in the pulse rate, and in four to six months the rate is normal. The cases of course vary somewhat in the time of response to treatment. A gradual increase in weight is usual. The exophthalmos is very slowly relieved, and may disappear. Some reduction in the size of the thyroid gland is usual, and in a number of cases it becomes normal.

The condition of myxedema may supervene after too massive or too prolonged radiations. It has been known to develop after several years. McDougall points out that a certain number of cases of hyperthyroidism become myxedematous under all forms of treatment, and even when no treatment is given.

The Occurrence and Present Chemical Status of the Female Sex Hormone.

In *Endocrinology* for May-June, 1926, which appeared some weeks later, FRANK and his colleagues state that they are able to show that the female sex hormone is present at times in demonstrable quantity in the circulating blood. Blood has been collected from hogs in estrus and anestrus. Following the methods developed in connection with the work on placenta and corpus luteum, lipoids have been obtained which, on injection into spayed rats, give the usual vaginal smear reaction. This phase of the problem is still under investigation. Loewe reports similar results.

From the studies up to this time they can say that the hormone may be found in the follicular liquid, corpus luteum, placenta, and blood of females in estrus. The term follicular hormone or ovarian hormone is therefore not sufficiently broad. "Female sex hormone" covers the source of origin as well as the biological function of the substance in question and should therefore be employed. As the hormone can be found in the follicle, corpus luteum and placenta, and as the corpus luteum succeeds the follicle, and the placenta the corpus luteum, the term "gestational gland," as a suitable appellation for this triad, has been suggested.

The active substance is a thermostable lipoid of high molecular weight. It is

soluble in all liopoid solvents and also in water under certain conditions. It contains only carbon, hydrogen and oxygen, and possibly merely carbon and hydrogen. It is not an ester or a fatty acid. It does not give cholesterol reactions. It does not contain an active carbonyl group. If it contains the hydroxyl group, this group is not essential to its activity. It is an unsaturated compound and is inactivated by attacking the double or triple bonds.

The female sex hormone is a specific substance elaborated by the gestational gland, taken up by the lymph and blood stream, and selectively utilized by Mueller's tract and the breasts.

The Treatment of Exophthalmic Goitre.

In the *Annals of Clinical Medicine* for May, 1926, KIMBALL states that the fundamental principle in treatment is to control the increased oxidation and expenditure of energy. Every case should be put to rest, mentally and physically. If the case is only mildly affected, rest with ordinary sedatives may be sufficient until a complete study can be made. If no causative factors are found which can be removed, and the increased metabolism persists, then thyroidectomy is advised. If the case is severe then rest in bed is necessary (hospitalization is preferable), and, unless contraindicated on account of the heart, he finds that the patient rests better if allowed to sit in a chair one hour, morning and evening. In controlling the high rate of metabolism and the aggravating symptoms due to it, our most powerful agent is iodine in large doses.

The work of Plummer has simply revolutionized the treatment of severe exophthalmic goitre. Whether we use Lugol's solution or not, a large amount of iodine seems advisable clinically. Lugol's solution contains 126 mgm. of iodine per cubic centimeter, and the average dose when the symptoms are marked is from 2 to 3 cc. daily. Frequently much larger doses are given with benefit.

As has been emphasized by Plummer and others, we cannot expect iodine to cure exophthalmic goitre. So far, its greatest good has been to reduce the extremely toxic patient to a level where thyroidectomy can be done safely. This is not necessarily final, and we, as scientific men, must know our patients' condition thoroughly from every angle, guide and direct their treatment, advise thyroidectomy if, and when, needed, and then give months of postoperative care. He has found it advisable to change the diet of the majority of postoperative cases. Usually there is a marked drop in the metabolism amounting to a hypothyroidism in the majority of cases, for months. These cases feel better and have more strength if put on a high protein diet.

In 1852 it was first shown by Bidder and Schmidt that large quantities of meat ingested resulted in a marked rise in gaseous exchange. The constancy of this increase in metabolism has since been amply confirmed, and Rubner has given it the name of the specific dynamic action of protein. Lusk experimentally showed this increase to be due to stimulation of the metabolism of the body cells, and he thought that it was due to the amino-acid groups in the protein. Rapport, working with Lusk, has studied the effect of various animal and vegetable proteins. He found that, if the nitrogen-content is equal, the specific dynamic action will be the same though the amino-acid content vary greatly. His work also showed that the basal rate is not changed. Therefore we need not worry too much about the intake of protein in the treatment of exophthalmic goitre unless the basal rate is so high that it would cause temporary distress to increase the cellular metabolism as a high protein meal would do; yet the need of protein is great and, as soon as the metabolism is under control, we should give it in normal amounts.

Further, it is important to keep up the iodine balance else the remaining thyroid tissue will either atrophy or undergo hyperplasia. He sees only good results from the use of 5 or 10 drops of Lugol's solution (or its equivalent amount of iodine) per week for several months.

Kimball says we must not think of exophthalmic goitre as a surgical disease, even though the majority of cases need a thyroidectomy. To date this seems to be our best method of control, but the best treatment of this disease is possible only when the patient is thoroughly studied by, and under, the constant direction of an internist.

In the same article in the *Annals of Clinical Medicine* for May, 1926, KIMBALL states that in treating toxic adenoma we must remember that we are dealing with tumor tissue. If the general condition permits, an early thyroidectomy is advised. If the heart is badly damaged two or three weeks' rest in bed is necessary. Some cases need digitalis, but it cannot be advised routinely. In cases with high metabolism suggesting the exophthalmic type, iodine in large doses may be used as in exophthalmic goitre preparatory to thyroidectomy. Some men are reporting good results from *x*-ray, in mildly toxic adenomatous goitre, but from his experience he prefers removal if it can be done.

In the mildly toxic adenomatous goitre in adults, iodine, as it is commonly used as a treatment for such a goitre, is not safe. In children and young adults, iodine, as it is used as a prophylaxis for goitre, has not, to his knowledge, caused toxic symptoms in a single instance, and he has been studying reports from approximately a quarter of a million children who systematically carry on the prevention of goitre.

In a recent publication Kimball reported three hundred and nine cases of hyperthyroidism in which the symptoms had been precipitated or made markedly worse by iodine. These were studied at the Cleveland Clinic and were from a total number of 2600 cases of hyperthyroidism seen in four and a half years. These cases of so-called induced hyperthyroidism were all in adults with a history of long-standing goitre, the average duration being eighteen years. The outstanding point in that survey is the fact that 88 per cent of all the cases which had supposedly been harmed by iodine had been given iodine by their physicians in large doses over a long period of time as treatment for adenomatous goitre. Also, out of this number, six cases were found, or 2 per cent of all, who had been using natural salt (iodized salt) previous to symptoms of hyperthyroidism, and the natural salt was considered (theoretically at least) as a cause of their toxic symptoms. All were cases of middle-aged women with a history of tumorous goitre for years. Three of the six had used natural salt. Studying the survey carefully he there were observed many times this number with exactly the same history, except there was no history of the use of iodized salt. Studying the survey carefully he could only feel that the use of iodized (natural) salt was a coincident rather than an etiological factor.

Adenomatous goitres are only a part of the endemic goitre problem. The same deficiency of food-iodine which was the origin of the adenoma causes repeated stimulation and hyperplasias of the gland, and is the most frequent cause of stimulation which results in the so-called toxic adenoma. The other most common stimulation of these tumors has been the treatment with large doses of iodine over a long period. This practice has been too frequent and is too well known for discussion.

The Treatment of Post-encephalitic Parkinsonism by Nicotine.

In the *British Medical Journal* of June 26, 1926, MOLL states that a series of thirteen cases of post-encephalitic Parkinsonism have been treated in this way with nicotine. Every case presented the typical signs and symptoms of Parkinsonism, which in most cases were of several months' standing.

All the cases had a history of an attack of "flu" or of a pyrexial disease with the typical accompaniments, such as diplopia, headache, and vomiting, which revealed that the illness had been an attack of encephalitis lethargica. The attack either marked the beginning of their present state, into

which they had gradually crept, or was definitely separated from it by a latent interval of nine to twelve months or even longer. In one case there was a definite history of head injury preceding the onset of Parkinsonism.

Of the 13 cases, 9 showed an improvement after nicotine treatment, whilst 4 were unaffected. Of the latter, one proved later on to be a case of true Parkinson's disease. The improvement in some cases was really striking. The patients volunteered the statement that they were feeling better because "their joints felt looser" or because "their limbs were freer."

Nicotine had no effect on either the tremors or the sialorrhea. The persistency of the tremors in some cases masked the improvement of the patient's stiffness, so that no real relief was obtained, and the patients would complain of not feeling better because the tremors had not improved. In one case the phenomenon known under the name of "kinesia paradoxa" was observed. A girl, aged fifteen, who had been undergoing treatment for a fortnight, was seen one day to run up the stairs as if her fetters had suddenly fallen off, but shortly afterwards relapsed into her Parkinsonian state. Some cases showed a marked improvement one week, only to fall back worse than ever the next. Any improvement of this kind was ascribed to the sudden variations and to the spontaneous recoveries so commonly seen in this disease, and not to any therapeutic effect of nicotine.

In observing the patient's progress allowances were made for improvements which might have been caused by suggestion; leading questions were therefore purposely avoided, and objective findings, such as a definite diminution of tone, a return of facial expression, or an improvement of the gait, were taken to be of more importance than subjective ones. All the patients were seen again six months later. The cases which had benefited by nicotine treatment had all relapsed into their previous state, and a case which had not responded to it had died. In one case the improvement lasted a month, after which the patient felt as bad as ever. In another the relapse occurred after only a week, and was ascribed to a sudden bereavement in the family.

[The dose of nicotine varies from 1/30 to 1/10 grain three times a day.—Ed.]

Ethylene Anesthesia.

In the *Current Researches in Anesthesia and Analgesia* for October, 1926, Hastreiter tells us that because of the conflicting reports emanating from various sources, coupled with the attitude of certain hospitals which barred its use, and because of the attitude of numerous surgeons who would not permit their patients to receive it, his experience with ethylene has been limited to its use during the past twelve months only. Owing to the fact that occasional explosions had occurred in the practice of different anesthetists, he approached the use of this anesthetic gas with some degree of timidity, but thus far the "Fates" have been most propitious, nothing of an untoward nature having developed to mar the efficiency of this excellent anesthetic.

In the majority of instances the administrations have been made with the ungrounded Seattle model of the Gwathmey, and in the minority with the grounded McKesson apparatus. Care has been exercised, in every instance, to eliminate the static spark as nearly as possible by flushing out the tubes, bag, and mask with water before starting; to place the mask upon the face, before the gases were liberated, and in each case to precede the use of ethylene by a nitrous-oxide-oxygen induction.

Realizing that the patient is a human being worthy of every consideration, and that the ordeal of anesthesia and operation is, at best, a most trying one, he has always felt that nitrous-oxide induction is very worth-while in preventing psychic reactions. It furnishes the anesthetist with a gas whose rapidity of action, absence of unpleasant odor, and freedom from choking place it on

a pinnacle far above any other that, at the present time, graces our armamentarium of anesthetic vapors, and is most acceptable to all patients.

The ages of the patients, in the present ethylene series, vary from three and a half years, the youngest, to seventy-five, the oldest, and the pathological conditions demanding interference comprise almost all types of upper and lower abdominal conditions; thyroidectomies, breast amputations, Cæsarean sections, hernias, amputations, bladder and kidney operations, and numerous orthopedic procedures, such as osteomyelitis, osteotomies, reduction of fractures, and congenital dislocations. No cases of head or nose and throat surgery appear in his list.

As a preliminary narcotic various combinations and doses of morphine and hyoscine or scopolamine have been given to the various patients, resulting in the conclusion that the best results, from the standpoint of mental composure on the part of the patient, a better relaxation, and a more tranquil recovery, accrue from the use of full doses of morphine, together with an adequate dose of hyoscine or scopolamine, given one and a half hours before operative procedure. The elimination of the preoperative narcotics has been tried, but the results have been so unsatisfactory that their omission is mentioned only to be condemned.

The effect of ethylene on the pulse-rate, especially in the patient with tachycardia, induced either by fear or by myocardial changes, as in toxic thyroids, is especially striking. Within ten minutes the rate has been reduced 20 to 40 beats, and, in the absence of hemorrhage, this reduction has, for the most part, been retained throughout the entire period of the operation.

That this reduction in rate was directly affected by the ethylene has been conclusively demonstrated in numerous instances by substituting nitrous oxide, whereupon a rapid increase could be noted, which, in turn, could be almost as rapidly decreased by returning to ethylene. Such a reduction in any individual, but especially in those possessing a myocardial weakness, is of the utmost importance in tiding such patients safely through the crisis of the postoperative period.

In the absence of hemorrhage, the normal blood-pressure is but little affected by ethylene, whereas in the cases of extreme hypertension the tendency to a reduction is usually well marked. These findings corroborate, for the most part, the work done by Lundy published in 1924.

Sweating, excepting in cases in which rebreathing is carried on to its full extent, is conspicuous by its absence. The distinct advantage of this to the patient already dehydrated is clearly obvious.

In the majority of patients, bleeding from the wound was especially noticeable, requiring the tying of many vessels before the hemorrhage could be satisfactorily allayed. The hemorrhage is similar to that encountered in nitrous oxide anesthesia, and considerably more than that ordinarily accompanying ether narcosis.

Seventy-two per cent of the cases recorded did no vomiting after returning to their rooms; twelve vomited intermittently during the day, and four excessively for several days. That morphine acted as a causative factor in two of these patients was demonstrated by omitting this drug at subsequent operations, when only slight nausea and no vomiting supervened. A fair proportion of these patients vomited at the conclusion of the anesthetic, but not again after consciousness was restored.

In those patients whose operations did not involve the abdominal cavity, relaxation might be said to have been quite as perfect as could have been expected under ether anesthesia. In the upper abdomen cases it was invariably found necessary to add ether at the beginning of the operation, and again during closure of the peritoneum, in order to give the degree of relaxation demanded by the surgeon. It was noted, however, that an apparent synergism existed between the ethylene and ether, as a much smaller

amount of ether than is necessary with nitrous oxide produced the desired effect.

In lower abdomen operations it has been noted that since the inauguration of morphine and scopolamine for preoperative narcosis, much better relaxation has ensued, even in the presence of that machination of his "Satanic Majesty," the self-retaining abdominal retractor. The average surgeon seems, according to Hastreiter, to have no adequate conception of the shock produced by its sudden and strenuous application, and its continued use throughout the greater part of the operation. A patient perfectly relaxed before will on its introduction immediately become tense and rigid, oftentimes requiring an amount of ether equal to that he has already had, in order to restore the equilibrium that previously existed. It has been observed that with those surgeons who do not make use of this device it has frequently been possible to carry the patient, for long periods of time, completely relaxed with ethylene-oxygen *alone*.

He concludes by saying that ethylene, in the hands of the competent, has demonstrated itself to be an anesthetic possessed of exceptional merit.

The Action of Various Anesthetics upon Uterine Contractions.

RUCKER in *Current Researches in Anesthesia and Analgesia* for October, 1926, asserts that all analgesics and anesthetics have more or less a tendency to quiet uterine contractions. He would rank the analgesics in the following order in this regard: Paraldehyde, magnesium sulphate, morphine, bromide, and chloral. Chloral alone has scarcely any effect, and hyoscine usually increases the force of the contractions. The general anesthetics can be very definitely placed in the following order in reference to inhibitory action on uterine contractions: Chloroform, ether, nitrous-oxide-oxygen, and ethylene. Sacral anesthesia with novocaine has an inhibitory or a stimulating effect whether adrenalin is combined with it or not.

The Absorption of Mercurials from Ointments Applied to the Skin.

In the *British Medical Journal* of June 26, 1926, WILD and ROBERTS report that under the conditions of their experiments it was found that when rubbed into the skin all mercurials were absorbed to some extent from all the bases tested.

That in all cases the greatest absorption took place from the lard basis, and that the amount of absorption with the lard basis increases more with a prolonged rubbing than with other bases.

That hydrous wool-fat was absorbed to a greater extent than lard, but that the mercurial was not absorbed with it, so that the absorption of mercury was actually less than from a lard ointment of equal strength.

That the absorption from a paraffin base was always less than from a lard base.

That the amount of mercurial absorbed was proportional to the amount of mercurial in the ointment, at any rate up to 30 per cent of the mercurial.

Of the different mercurials examined the mercuric oxide was the most readily absorbed, either as an ointment or in the form of the official oleate. This, however, is not suitable for use when the general absorption of mercury is desired, as ointments containing over 10 per cent of the oxide cause considerable irritation of the skin.

Ammoniated mercury and mercury salicylate were absorbed almost as well as the oxide. Calomel was absorbed to a less extent than any of the other mercurials examined.

Metallic mercury was absorbed rather less than the oxide, but can be used in stronger concentration without causing undue irritation of the skin. The official mercurial ointment with a lard base seems to be the best preparation for insuring the general absorption of mercury. The inunction of 4 grammes (about 1 drachm) for two minutes gave, on an average, an absorption into the body not exceeding 0.12 gramme (about 1.84 grains) of mercury, and after ten minutes' inunction an absorption not exceeding 0.17 gramme (about 2.61 grains).

Introducing Solutions Subcutaneously.

In the *Boston Medical and Surgical Journal* of July 29, 1926, VAN HOOK protests against the violent disruption of the loose subcutaneous tissues by the needless, sudden introduction of quantities of solutions into them. It may suit the convenience of thoughtless attendants to throw distending masses of solutions into the submammary tissues, but it serves no useful purpose to introduce those fluids much faster than they can be absorbed. And every thoughtful person will admit that the rapid introduction produces trauma, even if slight, and often pronounced pain and discomfort, while sloughing is an occasional misfortune.

Again, he protests against the thrusting of heavy needles through the skin of unanesthetized patients without preliminary local anesthesia. Often one sees enthusiastic young men drive needles more than a millimeter in diameter through the skin of sensitive patients, even women and children, in a manner most careless and cruel. A hypodermic syringeful of one-per-cent novocaine solution used beforehand in preparation for each large needle thrust through the skin prevents pain.

The special object of his communication is to recommend a very gentle and efficacious procedure for use where, as is so often the case, fluids are needed for introduction with moderate rapidity only. Where the patient can absorb from the stomach only small quantities of fluid or can utilize only moderate amounts of fluid by proctoclysis the introduction of one to three liters of solution per twenty-four hours may yield the happiest of results. This effect may be brought about, as his own experience has demonstrated, by the following method:

From a reservoir kept warm by an electric-light bulb, carry down a tube interrupted by a drop-regulator mechanism (proctoclysis drip bulb) to the patient's mammary regions. If a single needle is used only one terminal tube is required; but if two needles are required, as is usually the case, a small y-tube is provided. The point of his suggestion is that ordinary hypodermic needles of gauge eighteen are quite large enough for most purposes. They are introduced directly, or, as he prefers, after the skin has been anesthetized by the introduction of a drachm or two of procaine solution through a number 27 gauge needle on a hypodermic syringe.

One eighteen-gauge needle, used with the drop regulator, will deliver fifty cubic centimeters of fluid per hour without distention of the skin or pain! This is a matter of much importance in the management of women and children. With no fuss and practically no pain the fluid is introduced and the therapeutic need is met.

One needle thus used will deliver twelve hundred cubic centimeters per day; while, of course, two needles will double the amount. The tubes bearing the needles are fastened to the skin with adhesive plasters. In extreme emergency additional needles might be used.

This method simplifies hypodermoclysis and removes its terrors.

Basal Metabolic Rate in Simple and Pathological Obesity.

In the *Journal of Laboratory and Clinical Medicine* for July, 1926, JONES states that a normal person, changing to conditions of living which make less strenuous demands for physical labor, or social activities, or are less stimulating to the emotional life, will in a few years time become obese, if the same food intake which previously maintained him or her at normal weight be continued.

The obesity of laziness and big eaters (simple obesity) and the obesity of eunuchoidism show no change in the basal metabolic rate, whereas the obesity of hypothyroidism, in both cretinism and myxedema, and the obesity of hypopituitarism, are associated with appreciable decreases in the basal metabolic rate.

Obesity is due to intake of food energy in excess of outgo of work and heat energy. Many factors influence the food intake. Similarly, many other factors influence the energy-outgo. But no case of obesity can remain a mystery as to its cause if these factors have each been taken into considera-

tion when balancing the total of the energy intake against the energy outgo.

In habitual undernutrition, the extreme opposite of obesity, the basal metabolism is markedly reduced. Reduction in the basal metabolism is, therefore, by no means necessarily associated with or followed by obesity.

The specific dynamic action of food, when calculated on the basis of the caloric intake, is not lower in the obese than in normals.

Many cases of obesity caused by a diet in excess of the normal body's needs (simple obesity) are often incorrectly diagnosed either as hypopituitarism or as hypothyroidism. Many cases of obesity due to eunuchoidism are also incorrectly diagnosed as cases of hypopituitarism.

Thyroid extract should never be used in the treatment of any form of obesity in amounts sufficient to raise the basal metabolic rate to more than about 10 per cent plus.

Any attempt at reducing the body's energy intake of food, as in "dieting," is promptly compensated by the body's reduction in energy outgo, thus defeating the purpose of the dietary reduction, and too often effectively discouraging the patient with the "dieting" method of treatment for obesity. Jones summarizes his views as follows:

DISTRIBUTION OF A 3000 CALORIE RATION.

INTAKE IN CALORIES		OUTPUT IN CALORIES	
Intake	3000	*Radiant energy:* maintains body temperature, minimum output of normal, fasting, waking, resting body, the basal metabolism. Varies with age, sex, indoor or outdoor life, thyroid medication, disturbances of emotional life, and in some diseases, hypo- and hyper-thyroid and pituitary conditions. (Medication with testicular, ovarian, or pituitary extract has no effect. Adrenalin, only slight and transient, i. e., about 20 minutes.) Calories.....	1500
Water, inorganic salts and vitamins, although necessary to life, possess no chemical energy.			
Sufficient protein must be taken to maintain the body's nitrogen losses incident to cell repair, and secretion of mucus.		*Mechanical energy:* supports muscular contractions. Varies with kind of work; also in overfeeding, by increasing desire for exercise, and in underfeeding (to lose weight) by decreasing desire for exercise. Calories.....	500
Water is retained in tissues, in starvation, sometimes even more than enough to offset lost weight from fat loss, but this soon reaches its limit, and shows as edema when water of body reaches from two to eight pounds above its normal water content.		Lost as unabsorbed bits of food in feces. Varies with excess fat consumption, but may be measured and subtracted from intake. (Balancing intake against outgo is made on basis of intake to tissues, not to intestinal tract. Calories.....	100
		Lost as epidermis, sebaceous material, hair, mucus, oil from skin. Varies with climate, strenuous labor, hot baths. (Losses from hot baths may be enormous.) Calories.....	50
Normally, food intake varies with motor efficiency of the stomach. No amount of previously laid down fat reserves can protect against "hunger pains" from an empty stomach.		Specific dynamic action of food. Varies with kind and amount of food. Averages 10 per cent of total caloric intake. Lost as increased body heat. Calories.....	300
		Total	2450
		Balance	550
	3000		3000
Obese subjects normally have large gastric capacity and shortened emptying time of stomach even with high concentration of fat foods in diet.		This balance of 550 caloric excess is laid down as protein for immediate structural uses, as in growth and repair, and as glycogen, and fat for storage purposes, the resulting increase in body weight depending on how the 550 cal. are distributed as protein, glycogen and fat. If the 550 cal. balance is a shortage, the shortage is taken from body's previously stored reserves, and the weight loss is in proportion.	

The Wassermann-fast Patient.

In the *Annals of Clinical Medicine* for June, 1926, WILE states that it should be generally conceded that the background of substantial treatment, extending as it did among older clinicians over a period of from three to five years, constituted a fairly safe guide that the individual would be unlikely to confer his disease upon others. If this were not true, with the tremendous incidence of syphilis as it has existed for the past four centuries and perhaps longer, the whole race would be thoroughly syphilized by this time.

To a very considerable extent, the interpreted value of the Wassermann test has been difficult of estimation by reason of the multiplicity of laboratory symbols. Added to this, there has been, at least in certain quarters, an attempt on the part of the laboratory serologist to explain to the clinician the condition of his patient, depending upon the degree of hemolysis which has taken place in the suspected blood. A clean-cut positive or negative, and a doubtful change, the last indicating repetition of the test, are of far greater value and much less confusing than one-plus, two-plus or three-plus reactions.

To predicate the degree of infection present, or to estimate in a given case the amount of pathological damage by a finding in the blood, seems about as rational as to state that the degree of agglutination could be accepted as an index of severity in a typhoid infection, or as an index of the presence or absence of complication in this disease.

Many a physician is lulled into a fancied security concerning the future prognosis of his cases by an apparent diminution in the intensity in the degree of hemolysis which takes place in his patient's blood. As already indicated, and allowing for the personal equation and laboratory error, such findings are of real significance only in early cases, and then are not constant.

As many on the other hand find themselves sorely perplexed and unable to exercise prognostic and therapeutic judgment, by tests which come back either stronger at the conclusion of a treatment, or else with hemolysis alternating weak and strong, with alternating reaction on the part of physician and patient of optimism and pessimism.

The awakening of a public consciousness to the extent of syphilis incidence, the arousing in the syphilitic himself of a sense of responsibility, as being a possible menace to himself and to the community, may be accredited, in some measure at least, to the fact that the patient too has learned something of what his blood test means. On the other hand, and particularly in the intelligent class of individuals, the constant reiteration and reference to Wassermann tests has resulted in a phobia analogous to and even worse than the syphilophobia of pre-Wassermann days. Who has not seen individuals visibly free from disease, conscientious in the carrying out of intensive treatment, involving great loss of time and a not inconsiderable sum of money, torn with anxiety because of a blood which, contrary to promise, has failed to return to normal! Pitiful indeed is the plight of such individuals, and seeing them as frequently as we do, dejected, morose and at times definitely psychotic, it would almost seem that it were far better that this phase of the patient's disease had remained for the doctor's information, and had not been added to the burden of the patient's worry.

In expressing these views, he realizes that they may be judged by those working in similar fields as radical and unorthodox. Long clinging himself to the view that we have something in syphilis which would serve as an accurate prognostic guide, it is with great reluctance that he gave these views up. It has been borne in on him with monotonous repetition that to maintain these views further is not only unsound, but that having forsaken them as such, the time had arrived to confess himself wrong and to give open expression to what he believes constitutes an error largely participated in by us all.

Endocervicitis: Its Prevention and Early Treatment by the Cautery.

In the *Journal of the Missouri State Medical Association* for July, 1926, CAMPBELL reminds us that linear cauterization for endocervicitis has frequently been mentioned in the literature since Dickinson's original article, but the method, while widely used by gynecologists, has not won recognition where its usefulness is greatest. He lays stress on three points: (1) The cautery is by far the best instrument we have for the treatment of a diseased cervix. (2) It is especially suited to the needs of the obstetrician and general practitioner. (3) It is an office treatment easily learned.

Every cervix should be examined six to eight weeks following childbirth. When exposed with a speculum the postpartum cervix is usually found to have a laceration of some degree. It may have a bluish, congested appearance, due to poor tone in slowly recovering pelvic tissues, and more or less of the red endocervix is visible. Besides an increased blood supply, we have a mucous membrane which normally is well protected and covered by alkaline mucus, exposed to irritation by an acid medium containing many bacteria.

The result is swelling with eversion, hypertrophy, and hyperplasia. The single layer of columnar epithelium may grow out and replace the squamous epithelium, producing the so-called erosion. The erosion is red and bleeds easily because it is vascular, newly formed tissue, covered with a single layer of epithelium. The result of this situation is a hypersecretion of mucus, interpreted by the patient as leucorrhea.

This cervix is potentially a chronically diseased one, but its course is many times altered by applying 15-per-cent silver nitrate to the hypertrophic area and prescribing hot astringent douches, such as zinc sulphate 1:50, to be used just before retiring every night. If there is not decided improvement in two weeks, then the cautery is in order.

Low-grade infection sets in when toleration for the ever-present bacteria is reached. The surface takes on a granular appearance as the epithelium is thrown into folds, drainage of the deep glands is occluded by edema, with formation of cysts, and infection spreads into the lymphatics of the uterus and the broad and uterosacral ligaments. The onset is gradual, in contrast to salpingitis, where attacks of acute low abdominal pain are the rule. In addition to the leucorrhea, the patient now has backache, feeling of weight in the pelvis, nervousness, and, as the patient expresses it, "has had female trouble ever since the baby came." This condition is a prolific source of popularity of the advertised cures of "female trouble," and candidness forces us to admit that the time-honored local applications and douches are almost as hopeless as internal therapy. Removing the tubes and the ovary which seems to be excelling in the accumulation of Graafian follicle cysts, ignoring the original focus of infection, gives some relief until the usual routine is resumed, when the trouble returns. The same applies to post-abortive streptococcic infection, with a small external os. Gonorrheal infection is more apt to run the classical course. While the cautery is not a panacea, it is by far the best we have at the present time for the treatment of this condition.

The cervix is exposed with the ordinary bivalve speculum. Mucus is thoroughly removed with a very thin paste of soda bicarbonate and peroxide. Cocaine in 10-per-cent solution is applied and, if the surface bleeds easily, an equal amount of adrenalin may be added to the cocaine. A small cautery wire at white heat is used. A heavy cautery is painful and causes scarring by burning too deeply and destroying all of the epithelium rather than the diseased part only. On each lip of the cervix two to four lines are burned at one-fourth-inch intervals, and about one-eighth inch deep, beginning well up in the cervical canal and extending to the outer margin of the red area. Experience with exposed areas tells us about how much to cauterize through a small os. The patient should be told that she will

have a profuse watery discharge for a few days, then it will become thicker, and gradually subside in three or four weeks. By being conservative, as many as three treatments at intervals of a month may be necessary, but no troublesome scar will result. Erosions disappear and the mucous membrane recedes to the normal position with an apparent narrowing of the external os until the cervix looks practically normal. Cauterization should precede repair of deep lacerations, and its use will change our opinion as to the advisability of repair in many cases. A large opening into a cyst permits the cavity to shrink and become filled with squamous epithelium. Polyps, a result of endocervicitis, are easily removed by this means.

This treatment comes nearest to restoring the normal physiology of the cervix. The abundantly satisfactory results are often discouraging to those whose ambitions are surgical, but the patients do not complain of this so long as they are relieved of their symptoms.

The Sanocrysin Treatment of Tuberculosis.

So much interest is always taken in any new method of treating tuberculosis that the following discussion of the value of sanocrysin from a book review on his product is appended from the *British Medical Journal* of July 17, 1926. So far as we can learn the same adverse opinions are held in this country.—EDITOR.

In a volume written in French, Dr. C. H. Würtzen recounts his clinical experiences of sanocrysin in the treatment of pulmonary tuberculosis. He covers much of the same ground as his predecessors, spending space on the reactions and the complications that follow excessive dosage. The volume contains two chapters—on variations in antibody response and on morbid anatomy—written by Dr. Hansen and Dr. Fogh respectively. Then follow the history of each patient and a review of the results obtained.

Würtzen divides his cases into three groups. Group I comprises 16 patients that were treated mostly in 1924 and have been followed up after discharge; half of these were mild, half were serious cases; after leaving the sanatorium 7 continued to improve and 9 became worse; one of the latter died of bronchopneumonia. Group II comprises 39 patients treated by 1-gramme doses of sanocrysin; the immediate results were as follows: 17, of which 14 were serious cases, died; of the 22 remaining patients 1 showed improvement as judged by clinical and roentgenological examination, 8 showed clinical but not roentgenological improvement, and 4 were frankly worse. Group III comprises 61 patients treated by 0.5 gramme doses; of these 8 died, 25 improved clinically and roentgenologically, 24 clinically but not roentgenologically, 2 were unchanged, and 2 were worse. All of the patients except 8 belonged to the Turban 2 or 3 category; of the 8 in Turban 1 only 2 improved both clinically and roentgenologically.

These figures seem to us to be meaningless. That sanocrysin is a dangerous drug there is no question; the fact that 7 out of the 17 deaths in Group II are attributed to the result of treatment suffices to prove this, without mentioning the albuminuria, the dyspepsia, the stomatitis, the anemia, the hemorrhages, skin rashes, glycosuria, and other complications observed in different patients from time to time. But whether it is of any value it is quite impossible to say—the cases are too few. One of the disadvantages of the clinician is that he sees his patients too closely. He finds it difficult to get away from them and view them with a true sense of relativity; so that when he has recounted the recovery of a few dozen patients he proceeds straightway to draw entirely unfounded conclusions. He is so imbued with the old adage about treating the patient and not the disease that he forgets that it is sometimes far more important to treat the disease rather than the patient. An experimental scientist wishing to

ascertain, let us say, the toxicity of a certain preparation, chooses fifty or a hundred animals of the same weight and age, brought up under the same conditions, fed and housed alike, and looked after with the utmost regularity; the dose administered to each is standardized precisely, and a post-mortem examination is conducted on each animal that dies. With these precautions he obtains the percentage mortality due to a certain dose. On repeating his experiment he may obtain a figure differing by 20 or 30 per cent or even more from his first titration; and not till he has worked out his standard deviation and obtained the degree of variation that is likely to be observed in similar batches injected with the same dose does he feel justified in judging of the toxicity of his preparation. The clinician manifestly cannot do this. His patients are of different ages, are brought up under different conditions, have received varying doses of bacilli at varying times, show lesions differing enormously, not only in their extent but in their nature, and are dissimilar in a number of other respects. These are treated with varying doses of a drug; some appear to react favorably, others unfavorably. From a consideration of a comparatively few such cases he hopes to obtain a definite answer to his question. The problem he sets out to solve is scarcely clearer than when he started; at the best he is justified in forming no more than the most tentative opinion. It seems to us that the labor expended by clinicians at present is on this account largely wasted.

If sanocrysin was capable of affording a rapid and complete cure of all tuberculous patients it might be possible to ascertain this from the treatment of two or three hundred cases; but when, as is abundantly shown, this is not so, the present method of investigation fails. To ascertain the value of the drug it is necessary to treat several hundreds of thousands of patients in the same way, to follow them up for years at least, and to compare them with similar patients who have received sanatorium treatment alone.

The Role of Insulin in Protein Metabolism.

JANNEY and SHAPIRO, in the *Archives of Internal Medicine* for July, 1926, state their belief that the data reported in their paper afford a logical basis for the thorough trial of the insulin-carbohydrate treatment in non-diabetic conditions involving strain on the protein tissues. Such conditions are prolonged infections, sepsis, malnutrition, non-diabetic toxic and comatose states; also trauma, particularly when accompanied by acidosis. Some encouraging steps have already been taken in this direction, particularly in the treatment of operative trauma and the toxemia of pregnancy.

As the seat of activity of insulin is in the protein tissues, it may be said that data from the literature establish the fact that the seat of insulin activity lies in the tissue cells of the entire organism. Large amounts of glucose disappear in the tissues during insulin activity. Such utilization of carbohydrates can be accounted for only by conversion into material other than glucose, and not by total combustion alone.

As protein sparing by carbohydrates is increased by insulin, they say that experimental evidence is recorded demonstrating, in normal human subjects, that insulin and carbohydrate spare more protein than does carbohydrate alone. As protein sparing by carbohydrate is probably an expression of protein synthesis from carbohydrate metabolites, the data here reported would indicate that insulin functions in aiding protein synthesis from carbohydrate, probably by providing necessary metabolites. Hence, insulin has an anabolic (protogenic) as well as a catabolic (glycolytic) function.

They suggest that diabetes may be a result of deficient protein anabolism. The foregoing data indicate that the ultimate disturbance in diabetic metabolism may be deficient in the replacement, regeneration and repair of protoplasm due to the lack of carbohydrate metabolites normally provided by the insulin. This hypothesis affords a rather attractive explanation for diabetic metabolism and symptomatology as follows:

Diabetic metabolism is characterized by protein loss, acidosis, adiposity, and lipemia, in addition to glycosuria and hyperglycemia.

In the severest diabetes, untreated with insulin, the body protein loss continues in spite of replacement, in the diet, by food protein and fat of the inutilizable carbohydrate. Protein loss must therefore be due to other than dynamic reasons alone. Such a specific breakdown of protein can be adequately explained as resulting from a lack of normal protein regeneration from indispensable carbohydrate metabolites supplied, in health, by insulin.

Such protoplasmic starvation, if prolonged, could lead to extensive cellular exhaustion and ultimately to death of the organism. Diabetic coma may be the clinical expression of such changes. Strain on the protein tissues would hasten the onset of such coma, which may be accompanied by a prelethal rise in the nitrogen output. Acute infections, trauma and pregnancy, common causes of diabetic coma, exert strain on the protein tissues.

The acidosis theory of diabetic coma is untenable, as coma may intervene with but mild acidosis. An increase of acid bodies results from protein loss and abnormal fat metabolism, which again may possibly be due to lack of certain specific carbohydrate cleavage products normally supplied through the functioning of insulin. "Acidosis" is to be regarded as an effect rather than a cause of this process. Diabetic adiposity and lipemia may possibly arise from fatty carbon chains by aldol condensation of carbohydrate metabolites normally entering into protein synthesis.

Impairment of protoplasmic repair processes can likewise account for the proneness to infection and slow healing exhibited by diabetic tissues, retardation of growth in young diabetic patients, and muscular weakness in diabetic patients even on balanced diets.

The return to normal of the diabetic patient treated by insulin would indicate that all the various metabolic and clinical manifestations of diabetes are due to one general cause, presumably the failure of utilization of carbohydrate. This "anabolic conception of diabetes" likewise recognizes one general cause, failure of utilization of supply of carbohydrate metabolites necessary for protein regeneration. The loss of carbohydrate fuel fails to account adequately for the total metabolic and clinical manifestations of diabetes.

The metabolism of inanition may be explained on an analogous basis. The lack of carbohydrate metabolites, as well as protein, in the food produces results similar to the lack of insulin in diabetes, namely, protein loss in addition to dynamic causes, acidosis and prelethal rise in nitrogen excretion. Administration of carbohydrate but not fat reduces the protein loss to a minimum, as insulin is present in abundance.

As to insulin-carbohydrate therapy in non-diabetic conditions, experimental support is presented for the extension of insulin therapy to various non-diabetic conditions, characterized by protoplasmic strain on tissues, such as inanition, trauma, and sepsis.

Angina Minor.

In the *British Medical Journal* of July 10, 1926, HAY insists that a damaged heart necessitates a sheltered life, and the reasons for the restrictions advised should be frankly explained to the patient. His full coöperation is imperative, and he must face his limitations and live within them. The efficiency of the myocardium must be maintained by adequate rest, a regulated life, and such medicinal measures as hematinics. When syphilis is an etiological factor, appropriate and efficient antisyphilitic treatment is, of course, imperative.

Since the work of the heart bears a relation to the body weight, an attempt should be made to bring the bulk of the body, when it is excessive, within normal limits. Careful dieting to obtain this result should be carried out and the results noted. An

abnormally high blood-pressure can sometimes be modified with definite relief to the overloaded myocardium.

Much can be done in the secondary anginas when by meticulous cross-examination the cause of the lowered threshold to pain has been discovered. All possible sources of persistent low-grade infections should be investigated and radically treated —dental sepsis, sinus disease, abnormal intestinal conditions, pyelitis, chronic appendicitis, etc.

An attempt must be made to eliminate worry and make sure of sleep. For this a mixture of ammonium bromide and antipyrin is especially helpful. In the readjustment of the patient's life, factors giving rise to mental strain and irritations should be obviated as far as possible.

As his last word, he lays stress on the very great importance of an early diagnosis when the symptoms, though but slight and elusive, are both ominous and sinister. An accurate diagnosis first, followed by wise treatment, offers some chance of arresting, or at any rate of retarding, the development of the pathological changes responsible for angina, is Hay's belief.

Surgical and Genito-Urinary Therapeutics

Acute Gonorrhea Treated with Mercurochrome and Protargol.

CHARGIN, SECKEL and STONE *(Long Island Medical Journal,* July, 1926) state that in their clinical work protargol has been the remedy of choice in the treatment of gonorrheal infection. On theoretical and experimental grounds, the silver salts seem best to comply with the requirements for an efficient antigonorrheal remedy. They are germicidal, penetrate the tissues, are comparatively non-irritating, and are non-toxic. In spite, however, of such theoretical advantages, it is found in practice that the use of the silver salts does not always produce the desired results. This has been attributed, in the main, to the fact that none of the silver salts seem to reach the deeper tissues in sufficient concentration to act as germicides.

Young is quoted to the effect that in spite of the high test-tube germicidal activity of solutions of mercurochrome, the results obtained by the local use of these solutions in acute gonorrhea have not been vastly superior to those obtained through the intelligent use of other drugs.

In conclusion they state that mercurochrome is an effective germicide, but it has not proved to be decisively superior to all other drugs in acute gonorrhea. The intense stain of clothes and skin produced by the drug is a drawback to its use by the patient.

The authors in analyzing the results state that of the patients treated with protargol they were able to follow 71 cases for varying periods of time. Of this number, 43 were anterior infections, and 26 of the 43, that is 60 per cent, were discharged as cured. The shortest time recorded for a cure was 20 days; the longest, 75 days; the average was about 41 days.

Twenty-eight of the cases were found to be suffering from anteroposterior infections on admission, and of this group 12, that is 43 per cent, were discharged as cured. The shortest time required to bring about the cure was 30 days; the longest, 140; the average, 73 days.

Comparing these results with those obtained in the cases treated with mercurochrome, they found that of a total of 76 cases, 45 were anterior infections, of which 22 cases, or 50 per cent, recovered. Thirty-one cases were admitted with an anteroposterior infection, and of these 9, or 29 per cent, were cured. The shortest time recorded for a cure in the anterior infections treated with mercurochrome was 24

days; the longest, 90 days; the average, 44 days. In the anteroposterior infections, the shortest time for a cure was 24 days; the longest, 65 days; and the average, 45 days.

If we compare the percentages of cures in the two groups treated with protargol and mercurochrome respectively, we find that in the anterior cases 10 per cent more were cured, and in the anteroposterior cases 14 per cent more were cured in the protargol group than in those treated with mercurochrome. In other words, the advantage is with protargol. In the anterior cases the shortest time in which a cure was established was 20 days where protargol was employed, as compared to 24 in those treated with mercurochrome. This again showed protargol off to better advantage. The average number of days in which a cure was brought about in the anterior cases using protargol was 41 days; in those using mercurochrome, 44 days. It is thus evident that in the anterior infections protargol seems to produce superior results. In the posterior cases the shortest time in which a cure was observed using protargol was 30 days, against 24 days where mercurochrome was used. This indicates an advantage in favor of mercurochrome. The average duration of posterior cases treated with protargol is 73 days as compared with an average of 45 days in the cases treated with mercurochrome. Here, as in the preceding, the results favor mercurochrome. The conclusion to be drawn is that in the anteroposterior infections mercurochrome seems to bring about a cure in a shorter period of time than does protargol.

The Age of Choice in Operations in Infancy and Childhood.

LANMAN (*Boston Medical and Surgical Journal*, July 8, 1926) states that operations of choice are usually for some congenital defect. If the lesion is in no way incompatible with normal development it is well to wait until the second year. This is particularly the case in operations of a major character. If the condition requiring operation is incompatible with the normal development of the child, surgical intervention is of course practiced earlier.

Birthmarks can be treated and shortly after birth by carbon dioxide snow, radium, or *x*-ray. Such marks as require excision, unless rapidly growing, should be postponed until the child is a year old.

Small growths such as supernumerary digits, wens and accessory auricles can probably be left until the child is two years old. If these blemishes be a cause of worriment and mortification to parents they may be removed at the end of the sixth month.

Circumcision is not advised until after the diaper wearing age. Operation for the correction of harelips and cleft palate is advised, the child being in good condition, between the fourth and sixth week. The early proper alignment of the maxilla is the basis of a successful cosmetic result in the lip itself. When the harelip is uncomplicated by a maxillary defect the operation may be postponed for practically any length of time. It is well, however, to close the defect in the first three months; not earlier than the fourth week. Cleft palate should be operated on toward the end of the second year. In the operation on the palate a healthy condition of the nasopharynx is essential.

Hydrocele usually gets well of itself, but if large it may be tapped; this at any time. If the hydrocele involve the cord it will probably require an operation, which should be done at the end of the second year.

It is held that hernia can in almost all cases be satisfactorily held by a simple woolen yarn truss. Operation is advised when the child is two years old. Operation is essential for permanent cure in all cases of inguinal hernia.

Spina bifida unassociated with nerve paralysis may be operated on the first few weeks of life. A meningomyelitis with paralysis is not benefited by removal of the tumor.

Exstrophy of the bladder should be operated on during the end of the first year by implanting the ureters into the sigmoid one at a time. Hypospadia is best done in a child three or four years old, if the open-

ing be near the glans so that the urethra can be pulled down and stitched to the latter; if the opening be far back it is well to wait until about the tenth year.

The third or fourth year is the best time for correction of web fingers.

For imperfect descent of the testes the operation is best postponed to between the fifth and sixth years.

Bearing on operations of choice in so far as the eyes are concerned, Cheyney speaks of occlusion of the tear ducts as best treated by cleansing with weak solutions of zinc sulphate. After a year probing may be done by one gentle in touch and skilled in the method. Congenital cataract can be left until the end of the first year, better still until the end of the third year. Surgical correction of squint should be postponed until the third year. Cheyney states that the youngest infant he has seen wearing glasses was an 18-months old baby who seemed quite placid and refused to allow these helps to vision to be taken away from him.

The Incidence and Prognosis of Hemorrhage as a Complication of Gastroduodenal Ulcer.

MANHEIM (*Medical Journal and Record,* July 21, 1926) bases his report on a study of 426 cases of gastroduodenal ulcer treated in the medical wards of the Mt. Sinai Hospital between the years 1915 and 1925 inclusive. The cases were selected ones, taking only those in which either the *x*-ray findings were positive for ulcer or the clinical diagnosis at least fairly certain.

The incidence of hemorrhage in the duodenal group was forty-eight out of 246, or 19.5 per cent. In the gastric group it was fifty-three out of 180, or 29.5 per cent. Of the entire series the incidence of hemorrhage was 23.7 per cent.

Bleeding from ulcer may occur at any age, but is most common between the ages of thirty to forty years. The prognosis as to life in gastric and duodenal hemorrhage is good. Contrary to many preconceived notions, patients rarely die of hemorrhage.

In this series of 426 gastric and duodenal ulcer cases from the medical wards of Mt. Sinai Hospital, 101 patients had severe hemorrhage. Seven of these cases (in the early years) were transferred to the surgical side for immediate operation; five of these seven died. The remaining ninety-four were treated medically. In this latter group there were four deaths, proven at autopsy to be peptic ulcer cases. This is a mortality rate of 4.2 per cent of the bleeding cases. Omitting the seven cases transferred to the surgical wards, we have four deaths out of 419 ulcer patients treated medically; a mortality rate of 0.9 per cent of the total ulcer group. These figures accord with other statistics.

Shall the patient with chronic recurring hemorrhages be operated upon? In this series of cases none of those with repeated hemorrhage died. The fatal cases all occurred as a result of the initial brisk hemorrhage. These were cases of profuse hemorrhage, with rapid and fatal termination, before medical or surgical treatment could have checked its course.

Does gastroenterostomy protect the patient with a chronic condition from a recurrence of the hemorrhage? Balfour noted that hemorrhage occurred after operation (gastroenterostomy) in 13 per cent of cases with a history of previous hemorrhage, and in 0.9 per cent of gastroenterostomy cases without a previous record of hemorrhage. Eusterman reports a recurrence of hemorrhage in 25 per cent of cases following operation; while Eggleston reports a recurrence in 11 per cent.

Hemorrhage alone, or the fear of a future hemorrhage, with no other alarming or incapacitating symptoms, is not an indication for surgical intervention.

There were no deaths in the cases of recurrent hemorrhages which occurred during the years of follow-up observation. This is a most important point. It corrects the impression, rather current, that a gross hemorrhage is likely to be followed in subsequent years by later more severe and probably fatal exsanguination.

Incidence of Pulmonary Complications Following Ether and Ethylene-ether Anesthesia for Surgical Procedures in the Upper Abdomen.

LUNDY *(Medical Journal and Record,* July 21, 1926) has endeavored to establish a statistical basis for the comparison of ethylene-ether and ether in their efficacy, and their effect on postoperative pulmonary complications and mortality. The results in two parallel series of six hundred cases have been tabulated. To make the two series analogous, each operation under ethylene-ether has a corresponding operation under ether, the site of the operation being similar, and the date and meteorologic conditions identical in each pair. Operation in the first case in each series took place January 1, 1924, and in the last case December 31, 1924. So far as conditions could be controlled the only variant was the anesthetic.

Ether was administered by the usual open drop method. When ethylene and ether were combined, a machine was used for controlling the amount of each. The greatest possible percentage of ethylene was used and only enough ether added to bring about surgical anesthesia. On account of the nature of the procedure, greater relaxation is required for operations on the gall-bladder than for those on the stomach, and sometimes several ounces of ether were necessary in the former. In such cases, although the anesthetic was classed as ethylene-ether, it was practically little different from ether.

The data bear chiefly on postoperative pulmonary complications and their relation to the original lesion, to the type of anesthetic, and to preliminary medication. The postoperative period is the time spent in the hospital after operation.

In thirty-one of the twelve hundred cases, bronchopneumonia followed operation; ether was given in twenty-two (70.9 per cent) and ethylene-ether was given in nine (29 per cent); no preliminary medication was used in twelve cases (39.3 per cent); morphine and atropine were used in nineteen cases (61.2 per cent); satisfactory anesthesia was obtained in twenty-two cases (70.9 per cent); death occurred in five cases (16.1 per cent).

The most favorable results in this series, from a view-point of anesthesia, postoperative pulmonary complications and mortality, were secured in the cases of gastric ulcer when ethylene-ether was used, and in the cases of cholecystitis without cholelithiasis when ether was given.

The best results, from the view-point of anesthesia and the incidence of postoperative pneumonia in duodenal ulcer, followed the preoperative administration of morphine and atropine and ethylene-ether anesthesia.

The net results, from a point of view of anesthesia, postoperative pulmonary complications and mortality, in cases of cholecystitis, whether or not there was an associated cholelithiasis, followed the use of ether without preliminary medication.

Since the percentage of ether required in the different operations varied so widely, it is impossible to draw general conclusions regarding the comparative value of the two types of anesthetic or the effect of the preoperative administration of hypnotics.

The Present Status of the Treatment of Sexual Impotence.

VECKI *(California and Western Medicine,* July, 1926) notes that the use of some internal remedy may be indicated, and that this is sufficient in some cases. The so-called aphrodisiacs sometimes accomplish something. Iron, arsenic and mainly large doses of strychnine may give results. Atropine, cautiously used, may help in some conditions; combined with some purgative it may have surprisingly good results in cases of autointoxication. Narcotics should not be used. Instillations of a drop or two of novocaine into the meatus is a safe if not efficient measure against premature ejaculation. Alcohol is indispensable in frigidity and premature ejaculation.

No matter what drug may be employed, in the great majority of cases simultaneous

feeding of desiccated glands of internal secretion is indicated. Either thyroid alone or in combination with suprarenal, pituitary, gonads, and hemoglobin. Small doses should be used over a long period. The patient, however, must be constantly watched; the influence of the opotherapeutic preparations upon well-being, weight and mainly upon the blood-pressure must be controlled.

In cases resisting internal opotherapy, intramuscular and intravenous injections are to be used, but only proper material freshly prepared will do. Almost constantly good results are obtained by subcutaneous implantations as devised by Stanley.

While it is now fully established that real testicular transplantation gives good results, only human glands or those of anthropoid apes can be used, and the difficulties of obtaining these are mostly insurmountable.

The properly performed Steinach operation prevents a premature ceasing of the internal secretory function of the testicle and frequently reëstablishes such function after it has become almost extinct. In some cases of premature ejaculation it is the supreme remedy.

Unhygienic habits must be corrected, the diet regulated, the intestinal tract kept clean, and in spite of all difficulties the sexual life must be regulated. Ultra-violet rays are sometimes useful; psychotherapy is never to be neglected.

The Treatment of Hand Infections and Injuries.

OPPEGAARD (*Minnesota Medicine*, July, 1926) notes that many hand infections reach dangerous and crippling proportions because of the lack of early and skilful treatment. All the blame cannot be put upon patients since they know, either by their own experience or that of others, that a visit to the surgeon even in the early stages means a painful and not always promptly successful operation. He speaks of dry heat efficiently applied, of splinting, of painless surgical procedures, and accentuates the need of observing the following points:

The practice of making unnecessary or prophylactic incisions to relieve pressure must be condemned.

Pus is not always present at the site of the greatest swelling, so we must differentiate between edema and induration. The point of most pain is the best indicator of the position of the pus.

Do not incise the distal phalanx along the palmar surface or crucially across the end, as the resultant scar will be tender and will interfere with the tactile sense. Should it be necessary to make an incision on the flexor surface, do not extend it beyond the first flexion crease of the finger for fear of infecting the tendon sheath. Make incisions along the side of the finger, where they can be lengthened and carried down to the bone if needed.

Generally in hand infections the loose skin on the dorsum will be more swollen than that of the palm. The majority of all cases, however, have the pus under the flexor surface.

The early recognition of tenosynovitis is imperative, so that prompt incision of the tendon sheath may be made, and the best possible function preserved.

Incisions must be ample to provide free drainage. They should be made in the long axis of the hand to avoid tendons and nerves. In palmar space infections make the incisions in the interdigital web and, as a rule, do not extend them beyond the first flexion crease.

Oppegaard particularly warns against the pernicious habit of expressing infected material or "squeezing a boil," which many cannot resist doing. This serves to spread the infection throughout the subcutaneous tissues. There is a simple method, however, whereby we can assist evacuation of the pus and débris. By placing the ball of each thumb on opposite sides of the incision, well away from the area of induration, we pull the edges apart. The pressure necessary to accomplish this is transmitted through the lever action of the indurated tissue; as expulsive force to the base of the abscess, while at the same time holding the wound apart. This method is also painless, since manipulation is beyond the inflamed area.

Urological Causes of Abdominal Pain.

BARNEY *(Boston Medical and Surgical Journal,* July 15, 1926) states that in a recent year there was a preoperative diagnostic error of only 4 per cent in the Urological Department at the Massachusetts General Hospital. The fact that abdominal pain may appear to be directly or indirectly connected with the appendix, gall-bladder or gastrointestinal tract, or with the organs of the female, does not necessarily exclude the kidney or ureter as its possible source. Nor does a persistently normal urine and a negative *x*-ray exclude these latter organs from consideration. It is quite as possible for abdominal tumors of obscure nature to have their origin in the kidneys as in other organs. In more instances than is now the case the possibility of a urological lesion should be considered in the differential diagnosis.

Goldstein and McBee have recently stated that 20 per cent of abdominal operations performed by various surgeons have demonstrated mistaken diagnoses, and it is reported by Blesh that 40 per cent of 5000 appendectomies were unrelieved of their symptoms by operation. The experience of the writer has been that of other observers, namely, that in from 15 to 20 per cent of lesions of the kidney and ureter, chiefly due to calculi, previous operation has been performed, without relief, for other abdominal conditions. In many of these little or no preoperative investigation of the urinary tract was made.

Stricture of the ureter has come into prominence in recent years as a frequent cause of abdominal pain, especially in women. It may, therefore, often lead to unnecessary surgery.

Since we have come to recognize that the ureterogram may be of quite as much importance as the pyelogram, certain conditions of the ureter hitherto unrecognized have assumed importance in the list of causes of abdominal pain.

Only recently has the ureteral kink been recognized and established as a clinical entity. While for a time no noteworthy changes may be found in the size or shape of the kidney pelvis, or in that of the ureter, except the kink, the faulty drainage of the renal pelvis produced by the kink is followed by infection, dilatation, and adhesions.

Another cause of abdominal pain of renal origin is that produced by aberrant vessels of the kidney so placed as to interfere with its drainage with more or less constancy. While the presence of supernumerary and aberrant blood-vessels of the kidney has been recognized for years by anatomists and surgeons, it is only comparatively recently that their clinical significance has been realized. These vessels are now recognized by the urologist as being a frequent and exceedingly efficient cause of hydronephrosis, and he is able to demonstrate their presence before operation with increasing accuracy. The fact that they may produce renal colic, the pain of which may resemble that due to lesions of other abdominal organs, that they may be accompanied by a normal urine, and that a simple clinical and *x*-ray examination is negative may lead to the performance of various abdominal operations which fail to give the desired relief. This is particularly true when the right kidney is involved.

Malpositions of the kidney, other than ptosis, and generally but perhaps inaccurately regarded as torsion, are occasionally seen, and these also may show little or nothing on physical examination, in spite of producing severe and obscure abdominal symptoms.

Another cause of abdominal pain, easily mistaken for appendicitis or what not, is incident to "horseshoe" kidney, which, although it is found to occur but once in about every 1100 persons, may fall into the surgeon's hands at any time.

There are also many other varieties of congenital abnormality of the kidney or ureter which may give rise to abdominal pain. One or both ureters may be bifurcated at any point from kidney to bladder, or there may be two ureters on one or both sides, with separate orifices in the bladder. The kidney pelvis itself may be bifurcated,

the two portions draining into a common ureter. Any or all of these conditions may exist and give rise to severe but misleading abdominal pain, the urine may be persistently normal, simple *x*-ray will show nothing of diagnostic value, and palpation will reveal nothing. Only by careful and very complete cystoscopic examination, which will include pyelograms and ureterograms, will the actual situation be made clear.

The Senile Hip.

GORDON *(The Practitioner,* July, 1926) notes that the condition as a rule appears after middle life, and though commonest in the manual workers who are subjected to the greatest strain, it is by no means confined to them. Similarly it is commonest in men, but is quite frequently met with in women.

The symptoms complained of are pain and stiffness. The pain varies considerably, both in intensity and distribution, and is not always confined to, or even located in, the hip-joint. The close connection between the sciatic nerve and the joint and the common origin of the nerve supply of both hip- and knee-joint explain why the pain is not infrequently referred down the course of the sciatic nerve, and sometimes to the knee itself, and not felt in the hip. It thus comes about that patients will complain of sciatica or trouble in the knee when all the time the lesion is in the hip-joint. Mistakes, however, should not occur if the patient is examined even in a cursory fashion, for it will be found that pain is induced by certain movements of the hip-joint, and not by movements of the knee independently of the hip, such as can be carried out with the patient lying on his face.

Clinical and radiographic examination of other joints serves to determine whether general osteoarthritis is present, or whether the case is one of true monoarticular hip-joint disease.

With the absorption of bone and the extrusion of osteophytes the protective synovial membrane becomes eroded and the cartilaginous and bony surfaces exposed. These are exquisitely tender, so that great pain is experienced when they are jarred or pressed upon. To prevent this, Nature attempts to provide splinting in the form of muscles held in spasm, and of these the iliopsoas is most commonly affected. Spasms of this muscle lead to a flexion deformity, whereby the joint is spared the jarring and pressure induced by the transmission of the body weight when the hip is rigidly extended.

Treatment must be directed, in the first place, to the general bodily health, and, secondly, to relieving local symptoms. Most of these patients are elderly, fat, and sluggish, and diet to counteract indigestion and reduce weight is indicated. It is often possible to persuade them to generally reduce their intake of carbohydrates and adopt one "starvation" day per week with considerable benefit to their health. By a "starvation" day is meant a day on which they go about their usual activities, but keep themselves up by stimulants and not by nutritive foods, so that for twenty-four hours they live on their capital. The stimulants, in the form of tea without sugar or milk, bovril, chicken or meat soup without vegetables, should be given every two hours and, if something more solid is insisted upon, lettuce, or a green vegetable purée of, say, spinach may be allowed.

Observations show that almost all these cases have a lowered basal metabolic rate, and so the administration of thyroid extract is called for, some cases, indeed, being obviously hypothyroidic. The bowels must be attended to and kept regular, and the promotion of diaphoresis by hot water or vapor baths is certainly to be recommended. Most of these patients who have retained their teeth will have unhealthy mouths, and in the interests of their general health these should be attended to. The dramatic results which sometimes follow similar treatment in infective arthritis must not be expected. It is clear that once osteophytes have formed, no physiotherapeutic remedies can remove them, and we must direct our efforts to the relief of muscular spasm, the reduction

of deformities, and the safeguarding of the joint from the strain of weight-bearing.

For the relief of spasm, heat is the agency on which we must rely, and this is best applied by local applications of diathermy or radiant heat to the affected joint, in alternation with hot water or vapor baths.

In order to relieve the joint from the strain of supporting the body weight, the provision of a weight-bearing walking caliper is necessary. It stands to reason that this splint must fit accurately, and really serve the purpose for which it is designed, otherwise it merely becomes an additional encumbrance to an already inefficient limb.

The Cure of Syphilis.

FOUQUET (*Urologic and Cutaneous Review,* July, 1926), after a discussion of the various tests of cure, states that there does not exist as yet one single clinical or laboratory sign capable of certifying that an individual once tainted with syphilis is definitely free from his infection. This is not to say that syphilis is not curable. Almost all syphilologists, commencing with Fournier, admit that the cure of this malady is possible. Comassi indeed says this "termination is the most common for well treated patients." Syphilis treated energetically, at the prehumoral stage in particular, gets well almost always. Boas speaks of 231 cures in 284 cases treated under these conditions. The patient cited by Carnowski, who having acquired a chancre at the age of eight years ceased to have recurrences after fifteen years and was always well and vigorous up to his eighty-first year, could be considered as cured. Artz gives 85 per cent of cures, Folland 40 to 90 per cent, Lesser 100 per cent.

If we have not the scientific proof permitting us to deliver to an individual a certificate of the cure of syphilis, we have nevertheless often a group of clinical and laboratory signs which constitute, when they are taken together, an important array of presumptions, permitting the belief that recovery has been obtained. This is the case with those syphilitics in whom the infection dates back many years who have not presented any symptoms for several years, who have had a certain number of negative blood seroreactions during two or three years, and who have persistently a normal cephalorachitic fluid. It would well appear that one could sanction marriage and procreation to such as these.

Postoperative Treatment.

DEAN LEWIS (*Boston Medical and Surgical Journal,* May 20, 1926) stated that the elaborate procedures formerly employed the night before an operation robbed the patient of strength and not infrequently instilled a dread, which could not be dispelled. There is no reason for depriving a patient of nourishment when an unusual demand is to be made upon his strength. Unless there is a mechanical obstruction food leaves the stomach in a few hours, and if light may be allowed up to a few hours before the operation. If patients who have been allowed food up to a few hours of the operation, as much water as they like up to within half an hour of the operation, and have had no strong cathartic, are compared with those who have been starved and purged, there can be no doubt that the former are more comfortable after the operation.

The postoperative treatment of several of the abdominal operations has been standardized. In the ordinary case of appendicitis, not complicated by peritonitis, a quarter of a grain of morphine may be given when the patient reaches his room. Liquid diet is continued for four days. An ounce of castor oil may be administered on the fourth day, and soft diet be commenced shortly afterward. The stitches are removed on the seventh day, and if a muscle-splitting incision has been used the patient may be up on the seventh day and leave the hospital on the eighth.

Backache may be troublesome and demand considerable attention. To avoid this care should be taken that the table is properly padded, and every effort should be made to see that the long muscles of the back are not

too much relaxed during the operation. A small pad under the lumbar spine may help, but in many cases any precaution which may be taken does not seem to avail.

The so-called gas-pains are frequently troublesome. Morphine may relieve. Cathartics frequently increase these pains. A rectal tube is of considerable value. Heat applied to the abdomen, an electric pad being used, often gives marked and rapid relief.

In the treatment of vomiting, which may occur after gastroenterostomy, considerable judgment may be required. Persistent vomiting or overflow of the stomach is due to a high obstruction, usually in the distal loop of the intestine used in making the anastomosis. The frequency of occurrence of this complication may be greatly reduced by suturing the mesocolon well back on the stomach.

Hiccough occurs most frequently as a complication in those cases in which the abdominal viscera and their peritoneal coverings are affected; next, most frequently in diseases of the brain and spinal cord. It is observed but rarely in diseases of the thoracic viscera.

Hiccough occurring after operations upon the abdominal viscera is usually reflex in character. Postoperative hiccough may be most troublesome. Operations upon the gall-bladder and stomach are most frequently followed by it. In some of these cases an inflammatory lesion extending to or involving the under surface of diaphragm may be demonstrated.

The stomach tube with lavage gives relief most frequently, when hiccough has developed after operations upon the stomach and bile passages. Lavage should be continued until the water returns clear. Nothing should be given by mouth and morphine should be administered from time to time to induce sleep. The cessation of hiccough after gastric lavage occurs too frequently to be accidental.

Injection of the phrenic nerve with alcohol should be reserved for those cases in which hiccough persists after all other types of treatment have failed, and control of the hiccough is necessary to maintain the life of the patient.

Acute dilatation of the stomach may be a complication of a number of different lesions. An analysis of the cases often renders difficult the determination of the etiological factors.

Certain facts have been observed which indicate that acute gastric dilatation occurring during or after abdominal operations may be reflex. Carlson and Luckhardt have demonstrated that visceral reflexes may be elicited by the stimulation of either somatic or visceral sensory nerves. The vagus has an inhibitory action on the cardiac and pyloric sphincters. Contraction of these sphincters on the other hand follows stimulation of the sympathetic fibers of the celiac plexus. Relaxation of the stomach accompanied by contraction of the pyloric sphincter has been observed after direct stimulation of the peripheral splanchnic nerves.

Most of the cases of acute dilatation of the stomach have been observed after laparotomies. In cases following operation few or no symptoms may be noted for from twenty-four to forty-eight hours. At times vomiting, usually thought to be due to the anesthesia, may be more marked than usual. The patient may complain of a distressing sense of fulness in the epigastrium. From this time on vomiting becomes the most constant and distressing symptom. Regurgitation rather than vomiting occurs and a thin brownish-black or greenish-black fluid runs from the mouth—the stomach seems to overflow.

The distress is not relieved by the regurgitation, and if a stomach tube is passed one-half to two or three liters of fluid may be obtained. A persistent hiccough—unfavorable symptom—may develop.

The abdomen is usually distended. In moderate cases the distention may be chiefly in the left side, but in severe cases it may be uniform. The greater curvature of the stomach may extend to the pubis.

Vomiting persists, thirst is marked, the urine is scanty and collapse develops. The patient seems to be rapidly dehydrated.

Nothing can be done in an operative way to relieve acute dilatation of the stomach. The most important point is early recognition, for removal of the fluid may permit of the return of power to the rapidly stretching musculature, and posture may relieve the pressure of the superior mesenteric artery. The fluid contents of the stomach should be removed. Lavage should be employed until the water returns clear. Nothing should be given by mouth. Normal salt solution should be given intravenously to restore the body fluids and morphine should be given to induce sleep.

Paralytic ileus has almost disappeared as a postoperative complication due to the perfections in aseptic technique. Mechanical obstruction still occurs occasionally. Pituitrin and cathartics are strictly contraindicated when an obstruction is suspected.

Early recognition of obstruction is necessary. The toxin which produces fatal results requires a certain time for development, and the obstruction should be relieved before it develops, certainly before any great amounts of it are absorbed.

Stone and Firor have demonstrated conclusively the toxic effects of the contents of obstructed intestinal loops. Lewis advises a jejunostomy, permitting of a constant drainage of such loops, even when there are no marked physical changes in the gut above the point of obstruction.

After operation fluids should be given by the mouth whenever possible. Water may be given by mouth as soon as the patient awakes, unless there is a distinct contraindication. Nausea may be controlled by water. If the patient vomits, it may be given again, for it dilutes and removes the ether excreted into the stomach.

If water cannot be retained when given by mouth, it should be given by the drip method. If the patient is dehydrated salt solution may be given intravenously, or if acidosis threatens a glucose solution is indicated combined with insulin. The continuous administration of salt solution into the subcutaneous tissues of the pectoral region is painful and is not indicated in the majority of cases.

In this relation and from the medical standpoint Bryant (*ibid.*) contributes a paper which he summarizes as follows:

Authoritative proof indicates that the normal duration of convalescence, both medical and surgical, averages six weeks.

To date, it is not within the power of the physician or surgeon to decrease below this average of six weeks the length of time necessary, with or without operation, for complete recovery of the human being from acute and serious illness.

To send the average patient out of an acute hospital on an average of three weeks as cured is merely to add to the thousands of half-cured persons who to-day bear witness to the failure of medicine to complete its job through intelligent application of known methods of adequate convalescent care.

Present surgical methods leave something to be desired, not only in the way of medico-surgical coöperation, but also in the line of continuity of care of the patient.

The patient, being human, appreciates not only surgical technique, but the utilization of known procedures which tend to promote peace of mind and bodily comfort.

The surgeon could well add to his perfect technique many small refinements of medical care which tend to keep the patient comfortable and cheerful.

Antepartum Accidental Hemorrhage.

Fitzgibbon (*Proceedings of the Royal Society of Medicine*, May, 1926) on the basis of experience as Master of the Rotunda Hospital, Dublin, finds cases that appear to be incompatible with the generally accepted views as to antepartum accidental hemorrhage. Bearing on accepted views as to revealed and concealed hemorrhage, the latter being attributed to disease of the uterine muscle, which may be irresponsive to stimulation and thus permit of passive distention, Fitzgibbon found that labor was the common outcome of these cases, and the labor was usually rapid, whilst the uterus acted per-

fectly both during and after delivery and quite irrespective of whether the case proved to be wholly revealed or was demonstrated after delivery to be a severe, concealed type by the expulsion of two or three pints of old clot from the uterus. That the collection of the clot in the uterus was due to disease of the muscle was quite inconsistent with its action during and after labor.

Bearing on the belief that accidental hemorrhage is due to toxemia, this is not in accord with the fact that such hemorrhage is more frequent in multiparæ than in primiparæ, though the latter suffer from other toxemic diseases twice as frequently as the former.

Vaginal plugging is a treatment accredited to the Rotunda Hospital. Tweedy advocated this treatment and expounded views as to how the bleeding was controlled by the plug.

Hysterectomy had been adopted as the treatment in a few cases, then Cæsarean section was substituted. The uterus was found to act perfectly, although hysterectomy was adopted on account of the supposed degenerated state of the muscle. Neither operation appears to be justified by the results obtained, when compared with other treatments.

The records of the hospital for eight years show 51 cases with 8 deaths; 16 of these were plugged with two deaths, four were treated by Cæsarean section with one death, three by hysterectomy with two deaths. The remaining 28 cases were treated palliatively with three deaths. In the external service 33 cases were recorded with six deaths. Four of these six fatal cases were plugged. Results show that from palliative treatment the mortality was 9.1 per cent; from plugging, 36.3 per cent.

The commonest symptom that brings a patient under notice is a sudden gush of external bleeding. If the discharge is looked at, it will invariably be found to be dark brown-red in color and completely free from friable clots; occasionally there may be small black, shreddy clots. The urine will nearly always be found to be albuminous and often foggy; the secretion of urine is usually diminished. The patient may be in profound collapse or may be physically strong, or in any grade between these two conditions. A general debility and lassitude is very common. The face invariably exhibits a dusky pallor, or a muddy complexion. There is seldom much edema, frequently none. The pulse-rate is either about 90 or over 120, the latter associated with the marked degrees of collapse. The uterus more commonly palpates normally, but may be tense, or tense and extremely sensitive; these characteristics do not always parallel the degree of collapse. In the majority of cases with a normally palpating uterus there is definite evidence of the onset of labor. The case appears to be one of toxemia with no suggestion of accidental hemorrhage; or there may be profound collapse suggesting an internal hemorrhage. The patient may die rapidly, or, while being treated for toxemia, suddenly exhibit external hemorrhage or profound and fatal collapse.

When there is external bleeding the blood is always dark, as distinct from red, and it never coagulates. It is not whole blood but the hemorrhagic serum expressed from coagulated blood, the coagula being retained in the uterus.

The general symptoms are those of chronic nephritis and consequent toxemia. The muscle fibers of the uterus are not affected and are quite healthy. There is no rapid bleeding at any time.

As a result of the relatively foreign body collected in the uterus the majority of cases result in an induction of labor. If the apoplectic condition of the uterus is relatively mild labor sets in, the serum is expressed, and the uterus, although in most cases taking on a somewhat increased degree of tension above that of normal labor, does not present a degree to call for notice. Labor terminates without undue alarm. When the hematomatous condition is more marked, the onset of labor results in

an abnormal spasm of the uterine muscle, which presents noticeable increase of tension between the contractions, and in some cases produces continuous pain with marked tenderness on palpation. Some cases go on to an extreme degree of apoplexy of the uterus without coming into labor, or responding to the stimulation of the contained blood-clot, and may collapse from extravasation and loss of blood without the uterus responding.

The occurrence of collapse is dependent upon the depletion of the vascular system. The essential fact to be deduced from observation of the above is that the bleeding is never sudden or rapid; it has been going on slowly for many days. The collapse, when present, is not due to a sudden onset or increase of bleeding.

If the fetus is alive the patient is treated on purely palliative lines, and watched. If albumin is present she is watched with a little more care. The occasional cases of persistent fresh bleeding may call for induction of labor after several days. The others clear up or end in uneventful delivery. Those patients showing toxemic symptoms ending in labor are allowed to complete delivery as a rule without interference, but if the uterus is tense or painful the membranes are punctured; the patient is kept warm with hot bottles and given water to drink freely. A patient showing debility or collapse is got to bed as rapidly as possible, given numerous hot bottles, interfered with as little as possible; if labor has started the membranes may be punctured at first and are usually punctured after a short rest. In profound collapse intravenous infusion is done at once; such a patient must be kept alive. Pituitrin in ½- or 1-cc. dose is given in a very bad case, but has little immediate effect; it is best administered after some evidence of recovery of the circulation. If the patient is in profound collapse and without evidence of labor the membranes are punctured and restoration aimed at. The puncture of the membranes results in the onset of labor and the termination of the pregnancy, when the patient is restored. No patient, no matter how she improves or what her condition was at the onset, is allowed to continue the pregnancy if the fetus is dead. Labor is always allowed to follow its own course; the fetus is always small and the patient practically always multiparous, so there is no excuse for any form of extraction. The uterus is always carefully controlled and stimulated by massage. Ergotine and pituitrin are often given immediately after delivery, to anticipate possible postpartum debility. The delivery of the placenta is usually followed by masses of old, hard, black clot which may be taken for active postpartum hemorrhage, but the character of the clots should make the distinction quite evident.

The Operative Treatment of Knee-joint Instability Following Crucial Ligament Injury.

KRIDA (*International Journal of Medicine and Surgery*, May, 1926) accepts the doctrine that the early treatment of crucial ligament injury should be by immobilization, and with frequently satisfactory results. Lovett and Jones believe that operation should be reserved for cases that suffer grave functional disability which persists in spite of the wearing of a well-planned and accurately-fitting mechanical support. The symptoms of crucial ligament injury are related essentially to instability of the joint. All marked cases of general instability are necessarily accompanied by relaxation, attenuation or solution of continuity of one or both crucial ligaments.

The specific instability which is said to accompany damage to the anterior crucial ligament is hypermobility in the anteroposterior direction, in the sense of forward displacement of the tibia on the femur when the knee is extended or slightly flexed. Hyperextension may also be present, as the anterior crucial ligament is one of the structures which checks this motion, the other being the posterior ligament of the knee-joint.

The specific instability which is said to accompany damage to the posterior crucial ligament consists in an increase in the mobility backward of the tibia on the femur when the knee is flexed. On walking, at the end of the step, when the leg is just about to be raised from the ground, the posterior displacement occurs.

The operation performed by the author was based on that devised by Hey-Groves and consisted in utilizing the iliotibial band to replace the ligament. A drill hole is made through the external condyle into the posterior portion of the intercondylar space, and a similar one through the internal tuberosity of the tibia, entering the joint just in front of the tibial spine. The fascial strip is threaded successively through the drill holes; it is pulled tight with the knee in semiflexion, and fixed to the tibia. Reports of three cases are not convincing.

Tetanus.

WEBB *(Ohio State Medical Journal,* April, 1926) sets forth Osler's record of two steel knives dipped in tetanus culture in 1891, from one of which a growth of virulent bacteria was obtained in 1902 and from the other in 1909. The spores resist boiling for from five to thirty minutes. The microorganism being anaerobic will best develop in a dirty closed wound. The toxin, which is one hundred times more poisonous than strychnine, is absorbed by the end plates of the motor nerves only, and is then carried slowly to the nerve centers through the axis cylinders and lymphatic channels of the epineurium and perineurium.

The blood stream carries the toxin to all parts of the body, whence it is absorbed through all the motor end plates of all the nerves and eventually reaches the cord from all over the body, even though the point of infection does remain localized. It is this secondary absorption that causes general as opposed to local tetanus, and it is by interfering with this that the prophylactic dose of tetanus antitoxin is so efficacious.

This is a so-called incubation period. This is usually ten days to two weeks, although it may vary considerably; a face injury for example, where no antitoxin is used, may be followed by symptoms in a very few days since the toxin has to travel only a short distance to the nerve centers. The other extreme may be reached, the symptoms not developing for months after the injury; in this case the germs or their spores having remained dormant in the tissues only to be aroused by subsequent manipulation or injury. For this reason all operations for the removal of foreign bodies from wounds where there is any reason to suspect a possible tetanus infection should be preceded by a repeated dose of antitoxin, even though some weeks have elapsed since the injury and antitetanic prophylactic injection without symptoms. It is wise also to always give a second and third prophylactic dose at intervals of ten days after the injury if any necrotic tissue remains in the wounded part.

The diseases which may be confounded with tetanus are rabies, hysteria, strychnine poisoning, and tetany. A careful consideration of the symptoms, the fact that in tetanus the jaw muscles are involved early and continuously, and the previous history of trauma, should render the diagnosis clear.

In all cases in which we have reason to suspect the contamination of the wound by dirt, which dirt in turn may have been contaminated by fecal matter of animals, particularly horses, even if such contact had been remote, we should practice prophylaxis by the immediate injection of 1500 units of tetanus antitoxin, together with a thorough cleansing of the wound, using antiseptics such as phenol or iodine to kill if possible any germs present, and opening the wound widely allowing the entrance of air, thereby rendering the field one unsuitable for the growth of any remaining tetanus organisms. This should be followed by a repeated dose of antitoxin in ten days or so if any further operation or manipulation at the site of the original injury is attempted, or if any soreness or necrotic material remains at the site of the injury at that time, for the orig-

inal dose of antitoxin will all have been eliminated after ten days, allowing surviving germs to throw out toxin unmolested.

When symptoms develop the patient should be kept in a quiet, darkened room, given very light or liquid diet, and the spasms should be controlled by chloral hydrate or its equivalent. Amyl nitrite or chloroform may be used in emergency. Fluids must be given in large amounts by mouth, rectum, or by parenteral injection, inasmuch as the toxin is eliminated through the kidneys. The spasms may be controlled by the intraspinous injection of magnesium sulphate as worked out by Meltzer, each injection of this being followed by about twenty-four hours paralysis of the nerve fibers. This treatment has no effect on the disease itself, simply preventing muscle spasm by a form of nerve block. It may well be used in connection with the antitoxin treatment, replacing narcotics and sedatives. It must be closely watched, for if the magnesium sulphate reaches the medulla, respiratory paralysis ensues. For this reason the patient should be in at least a semiupright position, and the method should not be used in children.

The site of infection should be widely opened and curetted out, or if possible should be excised. A fairly large dose of antitoxin, 10,000 to 15,000 units, should be injected into the tissues around the wound. While under the same anesthesia the patient should be given 10,000 to 20,000 units of antitoxin intraspinously, from 30 to 50 cc. of spinal fluid being drawn off through the needle prior to introducing the serum. In addition, from 20,000 to 50,000 units should be given intravenously. All this should be done within twenty-four hours.

Small doses of antitoxin should be given at weekly intervals for weeks after all symptoms have subsided; otherwise some hidden culture may continue to throw off toxin and again set up symptoms after all the antitoxin has left the system, for tetanus is a toxemia and the antitoxin only neutralizes the toxin then present and does not destroy the organism producing it.

Treatment of Acute Peritonitis.

WEEKS and BROOKS *(California and Western Medicine,* May, 1926) note that the operative treatment of acute peritonitis is more or less standardized. The less the surgeon does the better. When in doubt a drain does little or no harm. It should be removed in two or three days. The first thought should be to keep the bowel at rest. Nothing should be given by the mouth. Compresses are comforting as applied to the abdomen. Abdominal distention should be relieved by tap-water enemas or colonic irrigations. It should be regarded as futile and harmful in the presence of acute peritonitis to use more drastic measures.

Enough morphine should be given to allow the patient to rest. Persistent vomiting should be relieved by gastric lavage. When the upper intestinal content appears in the stomach, it should be removed by gastric lavage every three or four hours, or the stomach should be continuously drained with a duodenal tube strapped to the chin with a piece of adhesive. This enables the patient to drink all the water desired and automatically to wash his stomach. Gastric lavage should be practiced early and often.

The funnel drop of 5-per-cent soda bicarbonate and 5-per-cent glucose is given to all these patients as a routine. If enough fluid is not absorbed through the rectum 1 to 3000 cc. of normal salt solution is injected beneath the fascia lata of the thighs daily once or twice a day. The authors state that this method of furnishing fluids and fuel has been used for the last five years, and no case of general peritonitis has been lost at this time among many patients who otherwise would certainly have died. Incident to much vomiting there may be developed an alkalosis which if uncombated will lead to tetany and death. The proper treatment is large quantities of sodium chloride, or, what is more prompt in action, 50 cc. of a 5-per-cent solution of calcium chloride with 1000 cc. 10-per-cent glucose given intravenously; followed within a few hours by 1500 to 2000 cc. salt solution injected into

the muscles. Omitting, of course, the bicarbonate of soda from the rectal drip.

If the condition becomes critical and acidosis is evident, 10-per-cent glucose solution, 2000 to 4000 cc. daily, is given, with enough insulin to burn the excessive amount of sugar, some of which otherwise would be excreted.

Mann and his coworkers recently established the fact that dogs, after the removal of the liver, developed a definite chain of symptoms, consisting of muscle weakness, loss of reflexes, return and exaggeration of reflexes, muscle-twitching, jaundice, coma, and general convulsions, in one of which the animal would die within two hours after the first signs of muscle weakness. There was a definite relation between the blood-sugar level and these symptoms. The symptoms began when the sugar content was .06 to .04, and the dog died when it reached .03. Accompanying this reduction of blood sugar, the glycogen content of the liver and voluntary muscles was reduced to 50 per cent. The symptoms could be relieved by injecting intravenously .25 to .5 gramme of glucose per kilogramme body weight. Within thirty seconds after the injection the dog would stand, walk, respond to call, wag its tail, drink water, etc. These beneficial results were specific for glucose or substances that yield glucose; and after the injection, when the blood sugar again began to fall, the symptoms would reappear in the order given, and could be relieved by further injections of glucose.

Finally, a second group of symptoms developed, consisting of restlessness, ataxia, loss of sight and hearing, coma, and the dog died quietly. Glucose injection was without beneficial result, as far as this last group of symptoms was concerned.

Reviews

MEDICAL CLINICS OF NORTH AMERICA. Philadelphia Number, September, 1926, illustrated. The W. B. Saunders Company, Philadelphia, 1926. Price per clinic year, paper $12, cloth $16.

As stated in the title, the clinics presented in this issue of this publication are those of Philadelphia practitioners, this being the second contribution from Philadelphia clinics this year, in that Philadelphians contributed the material for the July issue.

Amongst the papers included is a clinic by Dr. John H. Stokes on a number of dermatological states, as, for example, The Problem of Malignancy in the Presence of Syphilis and the Differential Diagnosis of Psoriasis and Syphilis, with a consideration of the Treatment of Lupus with special reference to the response to *x*-ray and radium. Another noteworthy paper is one by Dr. Stroud upon The Value of Quinidine in the Treatment of Auricular Fibrillation, and still another by Dr. Gordon upon The Heart in Tuberculosis. That well-known gastroenterologist, Dr. Rehfuss, has a clinic upon Chronic Duodenal Pathology, and Dr. Gittings one upon Malnutrition as the Modern Pediatric Problem. In Dr. Riesman's paper, when discussing the vasomotor paralysis which sometimes develops in the course of pneumonia, he recommends the hypodermic use of surgical pituitrin every six hours, and considers that digitalis is not to be used unless the pulse-rate gets in the neighborhood of 100. In Stroud's paper he takes a most conservative position in regard to the use of quinidine in auricular fibrillation, stating that while it is evident that the drug must be used with great caution, his experience has led him to believe that it is often a useful drug, it being remembered, however, that it is contraindicated in congestive cardiovascular failure, except in a few unusual cases. He quotes the interesting work of Bloomguard and Weiss, who, by injecting certain emanations of radium C in the vein of the right arm with the radium detector on the left

arm, were able to determine the rate of blood-flow in individuals with normal and abnormal cardiovascular failures. In auricular fibrillation there is a retardation of the circulatory flow, it being only half the normal in cases in which there is congestive heart failure. This is an interesting scientific manner of determining what was previously clinically obvious, but now proved by accurate measurement.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., assisted by L. F. Appleman, M.D. Volume III, September, 1926.

This well-known summary of medical literature for the past twelve months contains among others in this issue articles on Obstetrics by Dr. George Gellhorn of St. Louis; upon Diseases of the Arteries and Heart by Dr. O. H. Perry Pepper, of Philadelphia; upon Diseases of the Bronchi, Lungs, Pleura and Diaphragm by Dr. H. R. M. Landis of the same city; another on Dermatology and Syphilis by Dr. Jay F. Schamberg; and, last of all, a summary of Neurological Literature by no less an authority than Dr. William G. Spiller.

All of these articles are prepared by the collaborator weeding out from medical literature papers of little importance and including those which he believes of definite usefulness to the practitioner, often expressing his own views as to the wisdom of the conclusions arrived at by the author who is quoted. This issue well maintains the reputation which its predecessors over a long number of years have established.

LES ENTÉROPATHIES MICROBIENNES. By Professor G. Sanarelli. Masson et Cie, Paris, 1926.

This small volume, in paper cover, of a little over 200 pages represents a statement of our increasing knowledge in regard to infection of the intestinal tract by pathogenic organisms, with a further statement of the deductions which can be reached from the standpoint of prophylaxis and therapeutics. The author has made himself thoroughly familiar with French and German literature, but there are relatively few references to English and American work. He properly takes the modern view that in typhoid fever the infection is a generalized one with the chief manifestations in the intestine. He discusses the effects in the intestine and in the general system produced by cholera, and goes so far as to include appendicitis as produced by pathogenic organisms in the digestive tract.

A very considerable number of illustrations showing pathogenic changes, as they appear under the microscope, are included, as, for example, the nephritis complicating cholera.

A large part of the text is devoted to the results of laboratory investigations upon animals rather than upon man. For this reason the book will prove, probably, of greater interest to the bacteriologist and pathologist than to the active clinician. But it is only proper to point out that the author takes a definite stand as to therapeutic measures, urging that we abandon the use of intestinal disinfection on the ground that it is inadequate, and on the other hand emphasizing the necessity of hygiene of the mouth and the use of specific vaccines.

STEDMAN'S MEDICAL DICTIONARY. By Thomas Lathrop Stedman, A.M., M.D. Ninth revised edition, illustrated. William Wood & Company, New York, 1926. Price $7.50.

We have noticed the appearance of each one of the editions of Stedman's Dictionary in terms of praise. It is published with a flexible binding, is more copiously illustrated than some other dictionaries, and contains at its end a table of drugs, doses and uses, with an appendix containing weights and measures, comparative metric scales and barometric scales. There is also a list of chemical elements. Opportunity has been seized to bring the text up to date as to drugs which are official in the last Pharmacopœia which has come out within the year, as well as the National Formulary of recent date. A number of drugs pro-

prietary in their nature have been dropped, because, as Dr. Stedman states, they have died a natural death through lack of advertising nourishment, but several hundred new titles have been introduced which more than compensate for the exclusion.

The several excellent medical dictionaries which are upon the market at the present time make comparison difficult, because they are so nearly equal in value. He who purchases this one will obtain a dictionary which will give him a large amount of satisfaction, because he will always find the information that he desires and will discover many new points of interest.

ELECTROTHERMIC METHODS IN NEOPLASTIC DISEASES. By J. Douglas Morgan, B.A., M.D. Illustrated. F. A. Davis Company, Philadelphia, 1926.

The author states that he has sent forth this book in the hope that thereby the medical profession may be supplied with a statement of the value of electrothermic methods, the manner of their application, and the means by which desiccation and coagulation are produced. He hopes through the medium of this work to supply the inexperienced operator with certain information with which to make a beginning.

He calls attention to the as yet meager teaching, in medical schools, of electrothermic methods. He therefore begins with a chapter on electricity; bearing on first principles, definitions and appliances; excellently done. Thereafter follows a brief résumé of the chemical and physical effects of currents. There is a chapter on Surgical Diathermy, its History, Terminology. There is one on Apparatus, one on Electrodesiccation, one on Electrocoagulation; followed by a General Summary.

There is a section devoted to tissue cutting by means of the high-frequency current. There is a final chapter on practical exercises in the use of the currents.

The author has covered his subject-matter in a little more than 150 pages, and, even for one who has not followed the development of electric methods, with singular clarity. Such methods of local treatment are daily becoming of greater importance in therapeutics.

A MANUAL OF PROCTOLOGY. By T. Chittenden Hill, Ph.B., M.D., F.A.C.S. Second edition, thoroughly revised. Illustrated. Lea & Febiger, Philadelphia and New York, 1926. Price $3.50.

This interesting edition of Hill's excellent manual differs from the first mainly from the circumstance that Coffey's technique for the radical operation of rectal cancer has been incorporated and illustrated.

The first chapter deals with methods of examination and diagnosis. Thereafter are considered catarrhal diseases of the rectum and colon, ulceration of the anus and rectum, ulcerative colitis, fissure, rectal abscesses, fistulæ, stricture, hemorrhoids, prolapse, pruritus ani, rectal incontinence, benign tumors, and cancer.

The author has confined himself strictly to the subject-matter; set forth briefly, clearly, and adequately. Anal fissure he treats palliatively by applying a 20-per-cent solution of cocaine, moderately stretching the sphincter, and using ichthyol 15 per cent in glycerin, or balsam of Peru 20 per cent in castor oil, applied upon a small pledget of cotton and allowed to remain for several hours. For the more radical procedures excision is advocated, or dilatation, or incision. As for the latter procedure it is advised that the fibers of the external sphincter should be divided just to the right or left of the posterior median line without regard to the location of the ulcer; the object of the operator being to eliminate the spasmodic action of the sphincter. The operation is done under local anesthesia.

For the relief of external hemorrhoid the author excises the clot, capsule and overlying skin en masse.

In the treatment of internal hemorrhoids the reader has an ample choice of operative procedures. In each case the technique is clearly described.

An excellent book, one which should be most useful to all practitioners who occasionally meet and treat anorectal cases.

Notes and Queries

Laboratory Dependence.

In an editorial on this subject, the *Western Medical Times* for August, 1926, states that all of us have formed the habit, to a greater or less extent, of depending upon this laboratory or that to assist us in making our diagnoses or the institution of proper therapeutic measures, and, we are free to confess, in some instances, they make a valuable addition to our clinical findings.

There are, however, laboratories and laboratories. Likewise, laboratory workers and laboratory workers. Some of them seem able to give us some rather conclusive answers to our questions, while others seem to have formed the habit of saying "Maybe so," or "I think so," but apparently never coming within gunshot of anything definite. Even with clinical case histories before them they never seem able to really reach a conclusion.

Many of our laboratory workers, like many of our other specialists, step right out of school into their special line of work. Aside from what they have seen from the clinical amphitheater benches or during their year as interne, they have had but little idea, clinically, of diagnosis, or therapeutics for that matter. They have not learned how to correlate the laboratory to the bedside—how to couple the theoretical with the practical.

However, these selfsame "specialists" will, and frequently despite the clinical symptoms to the contrary notwithstanding, reach half-way conclusions and insist that they are right and that the clinician—possibly a man of years of practical experience—is all wrong. Even after therapeutic measures, successful in nature, have been established, some of these laboratory workers will continue to insist that the clinician is all wrong, but always their dictum seems to consist of "Maybe so," or "I think so." But they do not tell—that is, really tell—the poor clinician what may be the real diagnosis.

The *x*-ray man will show you a film and say, "This looks something like so and so or such and such," but not infrequently you cannot pin him down to anything really definite. He is rather frequently—the films are thin and show but little—prone to give you the "Maybe so" or "I think so" reply to your question.

You send specimens to the chemical and physiological laboratories—send the same thing to several of them, if you are wise and the patient can stand the tariff—and not infrequently you will get a varied lot of opinions, some positive and some negative.

But for your self-protection, if not for the good of the patient, you are obliged to continue patronage of these specialists who should give you a lot of valuable information and tell you what to do. If you do not patronize the laboratories, but depend upon clinical manifestations and things do not go as they should, then you are criticized. However, if you have given the laboratories the work, no matter what the outcome may be, your skirts are cleared, for you have had your patient properly "analyzed."

Because of the "Maybe so" and "I think so" decisions we sometimes get very much disgusted with laboratories of all sorts and almost conclude, criticisms to the contrary, to depend wholly upon clinical manifestations, for that is what we have really had to do even after the laboratories have taken our patients' good money.

We have the idea that, like the surgical specialist, the man in the laboratory would do well to practice general medicine sufficiently long to give him an insight into its practical side. He should be able to make a diagnosis upon the basis of clinical findings and to correlate the laboratory findings therewith. He should learn how to prove that such and such laboratory findings, and particularly the *x*-ray film, agree with those of clinical nature. In other words, if it be possible, the laboratory specialist should more nearly reach some definite conclusion and quit doing so much guessing. We might like him better and use him more if he would.